Strategic Enactment of Front End Innovation

A case study of multiple enabling opportunities

Brønnum, Louise

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

STRATEGIC ENACTMENT OF FRONT END INNOVATION:

A CASE STUDY OF MULTIPLE ENABLING OPPORTUNITIES

by
LOUISE BRØNNUM

DISSERTATION SUBMITTED 2017

This publication is based on the dissertation

STRATEGIC ENACTMENT OF FRONT END INNOVATION:

A CASE STUDY OF MULTIPLE ENABLING OPPORTUNITIES

by

LOUISE BRØNNUM

DISSERTATION SUBMITTED 2017

This publication is based on the dissertation

Dissertation submitted: 01.05.2017

PhD supervisor: Professor Christian Clausen
Aalborg University

PhD committee: Professor Peter Karnøe (chairman)
Aalborg University

Professor Raghu Garud
The Pennsylvania State University

Professor Jérémy Legardeur
Technopole Izarbel

This publication is based on the dissertation

Published by:
Aalborg University Press
Skjernvej 4A, 2nd floor
DK – 9220 Aalborg Ø
Phone: +45 99407140
aauf@forlag.aau.dk
forlag.aau.dk

Printed in Denmark by Rosendahls, 2017

ENGLISH SUMMARY

Front end of Innovation has for years been on the innovation agenda, and most established development companies are working explicitly with a focus for bettering the conditions for front end. However front end is difficult to handle in mature development organizations, as there are many agendas that explicitly and implicitly influence the development opportunities.

In this thesis I report on my journey through the contested field of front end of innovation. My observations of the many failed attempts of making sense of front end have led me to present an alternative perspective for understanding and thus enable front end. With a departure in my review of front end literature I challenge the normative and singular perception of front end. This singular focus on either changing the organization, developing an alternative development process or applying another type of method do not support an understanding of how front end is enabled prospective.

I contribute to the front end discussion with an in-depth case study where I have studied the actors; what they say and do when enabling front end development in a mature development company. With basis in an Actor Network Theory (ANT) ontology and epistemology, I argue for an alternative perspective for enabling front end. By analyzing the strategical enactments performed by the actors in a front end setting I demonstrate and describe how they succeed in enabling front end in multiple ways. The existence of multiple perspectives of front end was inevitable when making sense of the empirical data and it challenges the normative understandings of front end found as found in the literature. I have applied sensitizing concepts when engaging with my informants and they have further served as common terminology and analytical tools for ordering and making sense of the data.

I do not propose of a plug and play solution as it would not make sense to apply in the perspective of a multiple front end. My proposal of an alternative approach and understanding of front end enables different discussions and perceptions of problems and possibilities. The hope is to partake in pursuing a more pragmatic approach to how we depict and stage front end of innovation onwards. Through ANT, it has been possible to study the actors and show how they make front end perform, despite the normative models and processes that frames front end in a way that is difficult to execute in a mature development company with many agendas.

DANSK RESUME

Front end of innovation har været på innovationsagendaen i mange år. Flere etablerede og modne virksomheder arbejder eksplicit med et fokus på at forstå og forbedre front end. Der findes mange indlejrede udviklingsagendaer i større virksomheder, der både eksplicit og implicit har indflydelse på udviklingsmulighederne i front end.

I denne afhandling redegør jeg for min rejse igennem det omstridte felt, front end of innovation. Baseret på tidligere forsøg på at redegøre for- og forstå front end vil jeg foreslå et alternativt perspektiv til, hvordan front end kan anskues, og herved muliggøres. Derfor udfordrer jeg, med udgangspunkt i et litteraturreview, den normative og singulære forståelse af front end, der omhandler organisationsforandring, udvikling af alternative udviklingsprocesser, eller anvendelsen af andre metoder. Ingen af de tre perspektiver supporterer hvordan aktører forstås i front end, og hvordan front end muliggøres fremadrettet.

Jeg biddrager med et dybdegående casestudie, hvor fokus er på aktørerne; hvad de siger og hvad de gør. Det er hermed et studie af hvordan og hvorfor front end performer som det gør, og hvem der gør hvad, når front end muliggøres i en moden udviklingsorganisation. Heri redegør og argumenterer jeg for, på basis af en Aktør Netværk Teoretisk (ANT) ontologi og epistemologi, et alternativt perspektiv på, hvordan front end kan forstås og tilgås fremadrettet. Ved at analysere de strategiske *enactments* i et front end casestudie viser jeg, hvordan aktører succesfuldt muliggør front end i et multipelt perspektiv. Det multiple perspektiv udfordrer den normative forståelse af front end, hvilket har været uundgåelig i arbejdet med empirien. Jeg anvender *sensitizing concepts* i dialogen med informanterne, og det fungerer som fælles terminologi og analytisk værktøj til at forstå data.

Jeg foreslår ikke en plug and play løsning, da det i et multipelt forståelsesperspektiv ikke er ønskeligt. Den alternative og multiple forståelse af front end, hvor aktørerne er i fokus, sætter mig i stand til at forstå og diskutere muligheder og problemer i et andet perspektiv. Igennem dette håber jeg at kunne bidrage med en mere pragmatisk tilgang og forståelse, hvor vi i fremtiden kan iscenesætte front end anderledes. ANT har her gjort det muligt at studere aktører og vise, hvordan de navigerer igennem front end, samt hvordan de iscenesætter multiple *development spaces* på trods af de normative forståelser af front end, som kan være svære at eksekvere i en etableret og moden udviklingsorganisation med mange (modsatrettede) agendaer.

ACKNOWLEDGEMENTS

My former boss once told me that I had to learn to be in the abstract phase in the development, the phase that is filled with ambiguity and uncertainties. I then told him that I liked being in that phase, but I liked being able to get out of it even more. I think I still agree with that, but I have come to learn the importance of the ability to navigate the abstraction and be okay with being surrounded by uncertainties and ambiguity. For some reason this stuck with me, and, to be honest, I think it is because he interfered at some point with my perception of myself and my stance towards development; especially the early stage and the explorative kind. I used to think of myself as someone who embraced the ambiguity of the explorative, but I actually think I strive to bring things to order, which, for the front end of development, might not always be the right strategy at all times. My boss basically called me out on this. In this regard, I took this comment on board, and I remember one work progress that I still look back to as being very rewarding as we specifically let ourselves be in the abstraction and ambiguity of the development opportunities. We were, for some spoiled reason, allowed to spend a fair amount of time on this specific assignment, which made the progress so much better, as the development was precisely characterized by being explorative. Being allowed to dive into the complex data, and thinking that we had cracked the code several times each day, ensured a broad and very different perspective for a possible solution in the end. In fact, I will go as far as to say we embraced and challenged the ambiguity and uncertainties and utilized them to understand new alternative perspectives. It was tough, as being in the unknown is hard, but it was also fruitful and rich in learning. I remembered this process while writing this thesis, and I think it makes a great deal of sense in relation to some of the key points I will present in regard to acknowledging and embracing the front end for what it is, and what needs to be considered when working towards enabling it.

There are many people that have played an important role in allowing me to write this PhD thesis, and I would like to say a huge thank you to each and every one of you.

To all of my informants, thank you for all of your time and your interest in my work. I enjoyed being part of your workdays and getting to know what front end was really about.

To Christian, it has truly been a journey for me and I have appreciated all the discussions we have had along the way. Your constructive feedback and your never-ending interest in my work have been priceless and are greatly valued.

To Rikke, Joakim, Anne Katrine, Anna, Charlotte and Signe, thank you! Without a doubt I can say that it would not have been the same without you. To my ever supporting and cheering friends Lise and Anne for reminding me that I can do it, and making me remember that I want to do it.

And finally big thank you to my family who have let me focus on completing this thesis: Sara and Rasmus for putting everything in another perspective. Andreas, I could not have done this without your support. That you also have taken part in shaping my understanding of the world in the process was only a pleasant surprise.

Louise Brønnum
Copenhagen 2017

TABLE OF CONTENTS

INDEX OF FIGURES

CHAPTER 1 - SCOPING

In this chapter, I will give an introduction regarding who I am as a researcher, and from where I have been informed into writing a thesis with this focus. The reason for including my story of how, and by what, I have been influenced is important when understanding how the choice of epistemology and ontology has been a key perspective in the reasoning in this thesis. To the best of my abilities, I lean toward a circular hermeneutic relativistic perspective for which I will try to account in a later chapter. I will describe my journey and show how different inputs have affected the thesis.

MY STORY

In 2009, I finished my education as an engineer from the Technical University of Denmark. My interest in the subject of this PhD began with my master's thesis and the understanding and problematization has evolved ever since the beginning of that project. To understand why I have come to write this thesis with the perspective that I have, I have to go back and elaborate on the hands-on experiences I have encountered when previously studying the front end and how different events and partial conclusions have caused my focus to change several times. Being trained as a design and innovation engineer has formed me into viewing concept and product development from a holistic point of view. In this regard, my master's thesis partner and I were interested in investigating and researching how a mature development company could become better at anchoring user insights in the constructions of early conceptual development. We had, over the course of our studies, seen different approaches to facilitate the innovation process in the early stages of concept development, such as those described by (Andreasen, Hansen, & Cash, 2015) representing the design engineering perspective and focusing on the process of constructing a concept. In this regard, they explore what type of information informs, and when and how it contributes in designing a product concept. The front end of innovation became a "thing" to study, generally in regards to what it is in front of. With an offset in this engineering design expert domain, our task was to research how concept development was understood and carried out in the case company, and, based on this understanding; propose new methods and tools that would allow the integration of new knowledge such as user input in concept development. The initial studies of the front end in the case company made it clear to us that it was not a lack of knowledge or know-how that made it difficult. The company had a well-established intranet with access to virtually all methods, tools and

processes described within this area. Furthermore, there was a department functioning as an in-house consultancy, assisting the project developers and managers with the development process in regards to applying and incorporating new methods and tools in the early stages of concept development. A new question thus surfaced:

> *Why was early concept development still difficult to carry out?*

As mentioned, our initial plan was that we, in our thesis, would understand what concept development was about, and, on that basis, develop a new development model, tool or process that would improve the capability for working with concept development. However, it became overly irrelevant to pursue this first line of thought. We did not wish to simply develop yet another innovation tool, model or process to be archived on the intranet; accessible to everybody, asked for by many, but applied by nobody. Instead, we changed our focus to what seemed natural based on our discoveries.

> *What influences the possibilities for concept development?*

Why are the different tools, methods and processes for different perspectives on development opportunities not applied when there is a demand for it amongst developers and managers?

This resulted in a different research approach, as we did not study a specific occurrence, but rather a phenomenon – in this case, early concept development or the front end of innovation. When studying a phenomenon such as this, the research can be taken in many different directions. We were assigned to a specific project that served as our main case study. On the basis of this case, and the developers assigned to this project, we had a starting point for understanding what concept development in the early front end entailed in that specific company. This research led us to focus on the many different perceptions of concept development, and thereby what informed the good concept. It also put research in concept development into a different perspective, as it did not only focus on what a concept should entail, such as economic dimensions, technical knowhow and production qualifications, but was also put in a context with perspectives such as development history embedded in the company and non-critical stereotypical visions of customers. The interesting thing was not if a process was facilitated in a certain way, bringing in different types of knowledge, but rather that the solutions would eventually be streamlined to the existing product portfolio or simply rejected.

We described this as the '*pen dogma*', with a clear reference to the understanding of the role of dominant designs. This pen dogma was present in the concept development phase, not as an explicitly known element to include in the design, but rather a latently known best practice for developing concepts that would ensure passing the next milestone. Another key finding was the development model that was implemented to aid concept development in securing progress. However, an incentive structure was associated with the model, prompting a bonus if passing certain milestones. The knowhow of passing milestones was based on experiences of how previous projects had passed milestones, and was aligned with streamlining the new concept to be familiar with existing designs or incorporating platform technology, which, in many ways, placed restrictions on the type of new concepts to be produced. In this regard, it became clear that the concept development had to be understood from a broader perspective, as there were many elements influencing and informing the solution space of new concepts; elements that were neither tangible nor explicit but instead often appeared as certain framings and understandings, and was performed in accordance with personal preferences and knowledge.

On the basis of this understanding of the field, the PhD thesis at hand was unfolded. There are many of the perceived understandings carried along from the master's thesis project that characterize and inform the approach and research of the empirical work. I will later elaborate on the sensitizing devices that I have developed, how they have been used and how they build on the experiences of my previous projects.

The conclusions made in my master's thesis may be far from those which I will present in this PhD thesis. Nevertheless, the change in focus and understanding of the front end began in the master's thesis, as I wish to propose the focus in the discussion of how to enable the front end of innovation to be changed from a focus on fixing the problems to first understanding the premises of the front end to then discussing how it should be enabled.

IDENTIFYING THE PROBLEM

There has been a great change in how I addressed my research, how I understand the field, and how I generate new knowledge and perspectives on the field of interest, and I will, in the next paragraph, describe my process.

THE PROBLEM

As part of my PhD courses, I attended a summer school (2013) offered by the Design Society within engineering design research, a domain which, during the course of my education as a design engineer, represents *half* of the competencies in which I have been trained, and thereby a crucial part of how I understand problems and development mechanisms. However, my understanding of the problem that is addressed in this thesis was difficult to work with and discuss with my peers attending this course. I have later learned that my project had a radically different ontological and epistemological perspective than most of the other projects presented at the course. In many aspects, I was asked questions in regards to what *product* I intended to provide, either in the form of new methods or tools of which I could measure an effect when implemented in a company. We were taken through many different exercises that challenged my understanding of my project and the problem with which I was working, but having to describe and explain what it was that I was trying to understand in the thesis gave me new insights and improved my understanding and what it was that I could uniquely contribute with in the front end of innovation discussion.

That my argument presented in this thesis is based on the utilization of the philosophy of science has come as a significant surprise, as I thought that I would find comfort in producing something more practical. This change in the initial focus regarding where a contribution is placed took form in one exercise I was asked to conduct at the same PhD summer school. I was required to draw my project, draw the complications that I had identified, and how it could be explained, simplifying it into a metaphor enclosed in a drawing. After some thought, I decided to further elaborate on a metaphor for cooking that I, in a workshop facilitated by John Bessant at the ISPIM conference in Helsinki 2013, had taken part in creating. Even though cooking had been used as a metaphor for stirring up all the elements that go into innovation and development, I found a storyline in this metaphor that would help me clarify precisely the problem that I was struggling to explain using far too many words.

As my intention is to guide the reader along the journey I have taken, I will now introduce the master-chef kitchen as a means for understanding the problems for working with the front end and evaluating its potential.

The idea behind the cooking metaphor is twofold: The first concludes the actual cooking and thereby shows the problems for why the front end is difficult, while the second determines how the front end is perceived and thus evaluated.

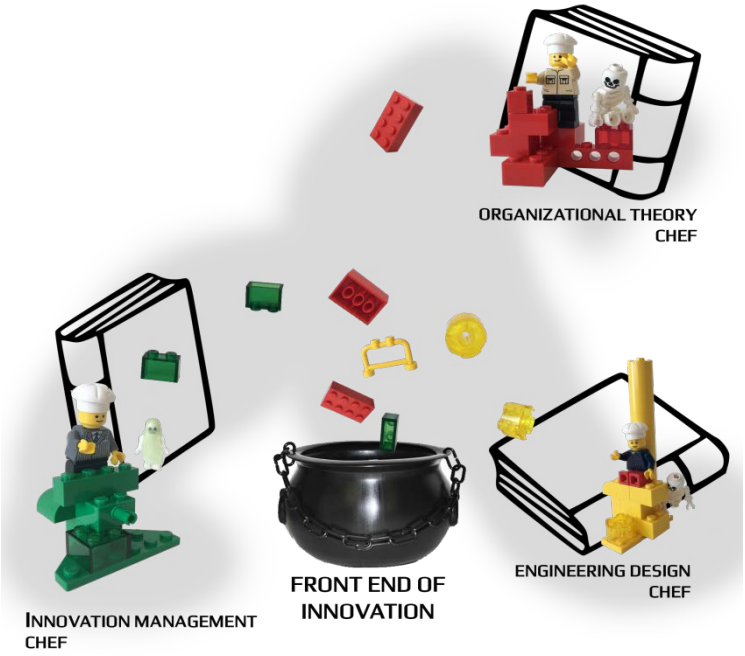

Figure 1: Cooking front end of innovation. The figure shows how there are different perspectives of front end. They each have a cook book of how to cook front end. However the ingredients may be the same, there will always be differences due to personal references and experiences. So even though the components may hold the same name and descriptions, when added to the front end dish it may vary in shape and color. Each front end perspective may think that they are cooking front end as described in their cook book, but the chefs of the other perspectives also contributes to the dish with the ingredients from their cook book.

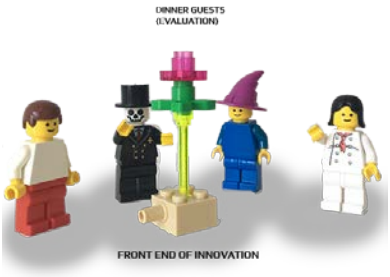

Figure 2: Furthermore, the dish of front end will be evaluated by others, others who have not read the same cook book and has their own preferences for how the dish should taste.

When understanding the problem as envisioned in the cooking metaphor, it became clear that it was not about choosing sides in the sense that I had to decide whether I thought design engineering, innovation management or the organizational theorist were most appropriate in the prioritizing when trying to enable the front end of innovation in a better way. Instead, it was about understanding how and why these confusions appeared, and how they indirectly influenced the final outcome. I still think that the cooking metaphor is representative, yet overly simplistic for what I intend to address in this thesis.

I have now elaborated on how I began to see the current normative way of discussing the front end as a problem when trying to enable it in practice. I will now describe the approach that I, throughout this thesis, will apply as the backbone to my contribution and thus understanding of the front end.

UNDERSTANDING ANT

There was a time when I did not understand Actor Network Theory (ANT), a time when I did not like ANT, a time when I liked ANT, a time when I thought it was a tool, a time when I thought I knew what ANT was, a time when I thought I knew ANT but did not, and then there is this time – now. This time, however, I think I know what I can use ANT for and what ANT enables me to understand, do and say. I will give a short introduction to ANT and the basic principles of how I understand ANT. On the basis of these principles, I will describe how I perceive ANT as ontology and what, from this perspective, it is possible to study. In retrospect, I did not know that researching the field with a perception of the world as including both human and non-human actors was

out of the ordinary in regards to the front end of innovation, or maybe not out of the ordinary, but something for which I should explicitly account. I knew of that one morning when I had a discussion with my boyfriend, who, at that time, was studying something within the sociological paradigm, and said to me: "the field is only interesting to study when Robinson Crusoe met Friday". Right there, I knew that I completely disagreed, and was then able to explicitly see how my understanding of ANT informs an ontology that actually allowed and ensured me that I put the front end of innovation into a different perspective. Even though quite naive, these figures 3a and 3b symbolize quite a leap that I took in my understanding of the field that I was studying.

3a 3b

Figure 3: Robinson Crusoe. Figure 3a depicts a man on an island. Sociology would not find anything to study as there are not interactions between people. In figure 3b the sociologists have something to study as Robinson meets Friday; another human being thus interactions. ANT would however claim that figure 3a is just as interesting to study as figure 3b. In ANT a researcher would study how Robinson interacted with the things or the lack of things and how he established a life on an island.

Many scholars have previously studied the front end of innovation as a research field, and have all come up with interesting and important considerations and perspectives. The ontological and epistemological assumptions that are given in this PhD thesis problematizes and puts front end in a different perspective, where the normative of front end is challenged by an understanding of actions, incentives and reasons, something that is not widely explored and utilized in relation to understanding how to enable the front end in mature development companies. The contested field, if such exists, is comprised of understanding what the actors do, why they do it and how, or presenting normative conceptions for how it should be done.

The front end of innovation is multi-dimensional and is put into many different perspectives. There is no definition upon which all scholars will

agree in regard to problematizing it, and thus where focus should be placed. It is multiple in the sense that many perspectives, such as innovation management, organizational theory, design engineering and project management all engage in the front end discussion with each their normative approach not recognizing and elaborating each other. When reading through different types of front end literature, each domain focuses on specific parts of the front end, and neglects to elaborate other perspectives. As a reader and researcher with a holistic perspective of front end, this has been confusing, as the presentation of the problems and therefore the opportunities are not put in perspective as a total package. I will, in a later chapter, unfold the different front end perspectives.

I cannot, of course, simply state that, so I will try and give some examples to support my point of view, as this should also serve as a means for arguing why I think ANT could be an interesting perspective for discussing the possibilities for enabling the front end of innovation in the future.

In my metaphor for cooking concepts in the front end, I have drawn the lines for understanding why front end is complex, as all of the perspectives take part in informing what front end could be considered as, but contribute with very different perspectives in regard to how front end should be *cooked*. However, in order to be able to understand what front end is, and thereby evaluate it, we need to see it in a holistic perspective and study the front end when it is taking place, and by whom, along with what makes it happen. When changing something within one perspective, it disposes of something elsewhere that is not known when only focusing on certain aspects and disregarding others, whilst still not knowing how front end is enabled.

FRONT END OF INNOVATION

I will now describe the front end of innovation that is informing this thesis. First, I will describe what I will refer to as front end, and how it is outlined and defined. Furthermore, I will describe the three main perspectives on the front end referred to earlier: innovation management, design engineering and organizational theory.

DEFINITION OF FRONT END FOR THIS THESIS

The Front End of Innovation (front end) has, over the years, been in focus as an important innovation discipline to master in development companies as a

mean for maintaining a competitive stance and advantage in the market. The front end has, at the same time, been recognized as a highly difficult discipline, as it is abstract and difficult to manage. Moreover, controlling the process by utilizing well-defined tools and processes for progression while keeping a focus on the ambiguous nature of the front end and the exploitation product development agendas also performed in the company, is challenging. This problem becomes explicit when the front end is studied in larger mature development companies, as the front end activities co-exist with the more established development activities often characterized as being exploitative. This type of development focuses on executing clearly defined challenges and problems as opposed to a front end that is more characterized as being explorative, entailing risks and uncertainties.

Therefore, as the overall understanding of the front end of innovation discipline, I turn to March (1991) characterization of the two types of innovation to distinguish and define front end in an organization's exploration representing the front end, and exploitation representing the product development. "Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution" (March, 1991:71). These two definitions are characterized in an organizational context and exist in relation to each other. March further emphasizes the constant battle between the two disciplines because they compete for "scarce resources" (March, 1991:71). One of the key points when talking about exploration and exploitation is that they exist in relation to each other, thus causing the ongoing battle. The two disciplines need to be understood in relation to each other. Explorative innovation is often met with challenges when perceived in the organizational context, where the competition (exploitation) is often well defined. March (1991:73) explains this battle as, "Compared to returns from exploitation, returns from exploration are systematically less certain, more remote in time, and organizationally more distant from the locus of action and adaption." Even though the two innovation disciplines are aligned and serve the same purpose (the company), the nature and structuring of the different innovation disciplines entails that exploitation feeds more directly into what companies live for – market launch and revenue. The explorative innovation is then left with trying to define alternative goals as indicators for success during the process.

The front end is not a plug and play system, and each company has their version of it, which is why March's (1991) definition is applicable, as it does

not dictate how to perform the development, but rather how to think and distinguish between different innovation challenges and development disciplines. However, the companies of which I have knowledge have at least one thing in common, and that is that there is a distinct awareness of the two types of development, and that one is in front of the other. I have heard front end as being referred to as concept development, radical innovation, fuzzy front end, early stage development and probably a great deal more. The point is that front end is an innovation term that also needs to be perceived in relation to something else, namely exploitative development is, in an organization, frequently facilitated though a Stage Gate-like model such as that described by Cooper (1990).

In this thesis, I refer to the front end of innovation as being an innovation discipline where the focus is on the early exploration in the development process. Through doing so, I will create the empirical data frame for how and what is perceived as front end of innovation by the informants.

In the term 'the front end of innovation' there are several sub-categories for the innovation and development that takes place. Radical innovation is considered as the most dominant and, is described by (e.g. Leifer, Colarelli O 'connor, & Rice, (2001); McDermott & O'Connor, (2002)). It is perceived as being an important variation of innovation within the front end of innovation, but also as a difficult discipline to handle in relation to other innovation activities. Radical innovation is described by Leifer et al. (2001:102) as: "(…) a product, process, or service with either unprecedented performance features or familiar features that offer significant improvements in performance or cost that transform existing markets or create new ones."

Leifer et al. (2001) describe how there in decades have been focus on understanding how to process and facilitate incremental innovation and the understanding of radical innovation is consequently lacking. However, radical innovation is important for companies as "They provide the engine for long-term growth that corporate leaders seek" Leifer et al. (2001:102). However, despite the importance of having a strong radical development discipline, knowing it and doing it are two different things.

Fuzzy front end is another term often applied in relation to explorative development. In Koen et al. (2001), fuzzy refers to the level of uncertainties and ambiguity that are present in the explorative development, This is equally true of radical innovation, which makes it difficult to handle. McDermott and O'Connor (2002) describe a study with the focus on how managers handle the

different challenges when working with radical innovation from a strategic perspective. McDermott and O'Connor (2002) argue that, despite the many different definitions of radical and explorative innovation, there is a consensus among researchers that it is difficult and different to managing and processing exploitative development. It is often difficult to get support for this type of project as it often challenges established perceptions of development being adjusted to support the more low risk and exploitative development projects. McDermott and O'Connor (2002:431) open up for a different, yet interesting, perspective for dealing with the front end of innovation, as he describes one of the major concerns for managers working with the front end is to protect their employees against failure as set and determined by the dominant exploitative development organization. This problem is interesting, as it puts into perspective the *'in front of something else'* as a factor that is very much important to consider and understand in order to enable front end activities. If the daily concerns of how to manage development revolve around dispositions made in a different place in the organization, then the front end needs to include this in an explicit manner when understanding how the front end should and can be managed, and thus enabled.

It is important to stress and remember that the front end of innovation is only the 'front' end when it is related to something else, as it is this relationship that defines many of the difficulties for working with the front end.

THREE PERSPECTIVES ON THE FRONT END OF INNOVATION

The front end is a discipline that is described from many different perspectives and, in many instances, is only partially accounted for. I will describe the essence of three main front end domains as a way of showing how each of these describe aspects of the formation of the front end, but also how this specific focus excludes or blackboxes other (important) aspects of the front end.

FOCUS ON INNOVATION MANAGEMENT

Innovation management is primarily concerned with the progression of the innovation project as a process. In so doing, it proposes its understanding from various models depicting the different phases that a development project goes through. A very well-known innovation process model is the Stage Gate model (Cooper, 1990) that focuses on defining gates along the process as a means for ensuring an effective development process. Tidd and Bessant have, across

several editions, described how to manage innovation (e.g. Tidd & Bessant, (2009). They propose a simple process model for innovation, where the focus is on "turning ideas into reality and capturing value from them" (Tidd and Bessant, 2009:19). The model is described as consisting of four phases. I will briefly touch upon what each of these phases entail as a step for scoping the innovation management perspective of the front end.

Figure 4: Tidd and Bessant (2009: 44). Model of the innovation process.

Phase one: searching for ideas. The ideas can come from anywhere, and the focus for the phase is to organize an effective search for these ideas to ensure the *right* idea is found. Phase two: selection of the *right* idea that, strategically, will give the necessary competitive advantage. Phase three: implementation of the idea into reality. In this phase, the concern is how to make it happen. "The task is essentially one of managing a growing commitment of resources – time, energy, money and above all mobilizing knowledge of all kinds (…)." (Tidd and Bessant, 2009:19). Phase four: capture the benefits of having produced something new which has not been seen before (innovation). This can be capturing value from the market and having people buy the new product, helping the world by conducting social innovation, justifying an investment, or learning from new processes.

The model is quite generic, and most innovation projects (if not all) will fit into these phases. The actual label on the phases is not what is most important; the point in focus for innovation management is that of processing innovation, and getting the innovation in focus from one box to the other. In the phases there are references to other disciplines such as R&D. However, what is not considered in a process model as just described is how development occurs, i.e. what goes into forming and constructing a concept/product. They refer to knowledge, but not how the knowledge is applied, how it should be formed, or how to work with the knowledge present. Ideas are, in this sense, represented as appearing after being processed through a phase. Ideas are explicitly

addressed when the phase in the innovation process revolves around searching for ideas, but, after that, ideas and the development of them are the results of a phase. For that matter, the ideas and the actual concept development are now elaborated and perceived as something that is dealt with within the phases but not as something that interferes with the progression of the innovation process. Ideas and concepts will appear or they are there and are developed by someone, somehow.

Furthermore, Tidd and Bessant (2009:152) describe a process for the type of innovation that goes beyond what they call steady state, to be agile and have the ability to move fast and tolerate high levels of risk. This type of innovation is, however, difficult to handle in established organizations. To accommodate the different characteristics of the innovation possibilities, they propose having a split model for the innovation process (two different foci), or to spin off the new ideas into a separate venture with its own innovation process.

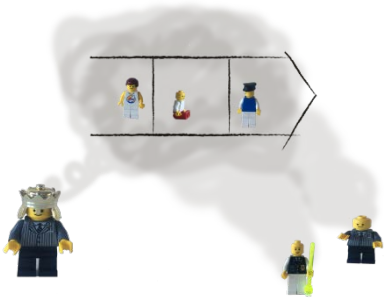

Figure 5: Front end of innovation from an innovation management perspective. The different actors working with front end are perceived in relation to where and how they fit into the proposed innovation model.

When reading through innovation management literature such as this, what I am lacking in my quest for understanding the difficulties of the front end is the dynamics of, for instance, the type of development that goes into the implementation phase and how people are supposed to work with it in terms of, for example, methods, who the people are, and what are their competencies. Or, alternatively, how organizations look – the available literature does comment on the importance of having the right organizational structure, but not what *right*, in this sense, would be.

FOCUSING ON ORGANIZATIONAL MANAGEMENT

Organizational management is concerned with how the organizations are designed and structured in relation to the front end. It focuses on creating the right divisions with the right competencies at the right place and at the right time. I will describe three main organizational structures within which the front end should exist. I have spent some time studying Deborah Dougherty and her take on organizations in regard to organizing the front end. Dougherty (2008a, 2008b) and Griffith & Dougherty (2001) describe the problematization of the front end as being revolved around the lack of cross-functional thinking when working with the front end in a mature development company. This is to be seen in the light of having dedicated front end divisions or hubs. The foundation for her discussions and proposals is that the front end is difficult to handle in a company context, and that the solution is not merely found in implementing new tools or processes (Dougherty, 2001). What is instead proposed is a new perspective within organizational theory that goes beyond focusing on structures as enablers for innovation. Dougherty (2001:615) criticizes the organization where "each department executes its own tasks in accordance with its own standards" and "(…) where people imagine their role and their unit obligations apart from those of others in the organization". She captures the different approaches and variations for best practice for facilitating the front end in different images and organization archetypes, with one of these images focusing on organizing the development according to the different experts' domains. The critique lies in the fact that each domain then has its own approach to handling the innovation problem, and the development is then fragmented. As a response to dividing the organization based on expert domain, Dougherty (2008a) proposes a cross-functional reorganization of the structures where focus for the organization is how the front end problem is/should be solved and what type of knowledge will go into accomplishing this. This entails an understanding of development more as a practice and a community that, in a joint venture, moves toward a common goal. When changing the focus to the end goal and how development is organized from expert domains to holistic and cross-functional problem solving, Dougherty argues that it will provide a different (and needed) drive for the developers, allowing them to work more innovatively. By gathering the competencies in a cross-functional manner based on the project at hand Dougherty (2008a) proposes these as enabling structures in a mature development organization that will further the innovation possibilities. Key to this aspect is to coordinate the cross-functional competencies.

Leifer et al. (2001) accounts for another way of thinking about organization and structures for the front end as the establishment of separated and

dedicated front end hubs that are placed parallel and out of the organizational context. The reasoning behind such a strategy is to separate it from being *in front of something else* and thus influenced by something that is not intentionally for the front end. Even though it may have disregarded the challenges of being in front of something, it has induced problems elsewhere, as the discoveries produced in such a front end hub will have to be returned back into the main organization for the exploitative development at one time. Leifer et al. (2001), further describe how radical innovation (front end of innovation) is highly dependent on many other factors that are anchored throughout the organization, such as resources and know-how, which makes it difficult to facilitate from a separate perspective.

In my case company, the front end is organized in cross-functional teams and assembled on the basis of the scope of the project. Resources are then acquired when and if they are needed. Furthermore, the company has tried various versions of innovation hubs that were facilitated and run parallel to the remaining parts of R&D, but common for those is that the front end is still experienced as highly difficult. When focusing on the structures for enabling the front end, the organizational studies have already moved noticeably from the understanding of an organization to be structured according to expert domains. However, the dynamics toward the different development processes that facilitate development are not regarded when defining the re-organization. Furthermore, the development, the methods and the processing of the different knowledge are likewise not elaborated upon and thus accounted for in the design of the enabling structures.

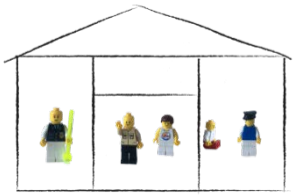

Figure 6: Front end of innovation from an organizational perspective. The variables for how to enables front end is how the organization is organized. The actors are placed in these structures.

FOCUSING ON DEVELOPMENT

When focusing on the developmental aspects as a strategy for handling the front end, the discussion revolves around how to understand concept development. This entails an understanding of the different elements that go into informing a concept and the different methods and tools applied in the development. Recalling my training as an engineer, this approach for understanding the front end plays an important role as this, for a long period, was how I approached front end.

When development is in focus in the front end from this perspective, it is in a very detailed manner towards the concept, such as how Hansen and Andreasen (2002) and Hansen and Andreasen (2005) describe it. In this framework for understanding and working with concept development, the focus is on the type of knowledge that informs a concept and how it is translated into concept attributes. The variable for good front end is, in this respect, what goes into informing the solution – product or service. The framework of Hansen and Andreasen (2002) consists of *the idea in* and *the idea with* and divides the concept into consisting of the technological context and the knowledge in regard to the use context. This is to be understood from the perspective of classical engineering conceptualization where the innovation and the concept revolves around the technological possibilities. Furthermore, Andreasen et al. (2015) have, in this book, summed up years of experience working with conceptualization and provides "(…) a process for, and deep understanding of, conceptualization". The process is perceived as being at the core of the design process and where new and unseen products are developed. The purpose for proposing this process is therefore to empower the designer, as design is the key factor influencing the concept. The premises for the conceptual understanding revolve around conceptualization as the center point. Andreasen et al. (2015:3) refer to this as a conceptualization strategy, and describes how designers act in "self-organized, self-propelling teams that interface with the organization (…)". When depicting the design process, there is a focus on the creation of the concept. In contrast to the innovation management process model, this is a process model that focuses on constructing a product by applying methods and tools for bringing forth the right knowledge to inform the concept.

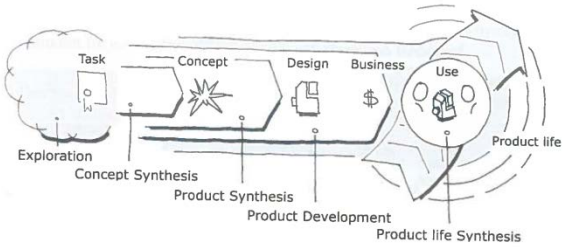

Figure 7: Andreasen, Hansen and Cash (2015: 4) a design model for the design process. The design of a concept is throughout the process developed.

When elaborating on the type of knowledge that influences the design possibilities, the company where this takes place is described and referred to as the place where the development is facilitated and from where the resources are present. The company is, for example, characterized as providing strategies that should be balanced according to the ambitions, resources and limitations, and is, in this manner, not reflected in regard to how it influences the development process, if not or if so. The organization is mentioned throughout the chapters from different perspectives, but it is not in the sense of what the organization imposes in regard to the development, but rather in what the development needs the organization to do. Within mature development companies, there also exists a development process such as that described by innovation management. However, these processes are different to the processes proposed with the development perspective in mind, as they focus on development activities and not the phases of a development in accordance to progression towards market launch.

How, for instance, the organization is designed, or which management concept is applied is not elaborated on as influencing the concept development and is referred to as being a one-sided entity. An organization is an organization, and a management concept is a management concept, and the design of new concepts is not treated as being impacted with a change in other perspectives. The model entails an understanding of there being an organization, and it needs to be taken into consideration, but not how or why it influences. Dorst & Cross,(2001) have in the engineering design field described and discussed how various models and methods support the process of bringing forth concept development. They describe how development is enabled by the existence of knowledge of the infusing of knowledge to take the concept further. However the normative understanding of only focusing on what takes place within the development process is not sufficient in understanding the experienced difficulties of maneuvering a concept

development forth. I find it difficult to apply this type of thinking to a mature development organization, as I will show that there are many other non-product oriented agendas present that interfere with the concept design. The development of concepts is condensed into a development process generically suited for all types of development across all kinds of context, such as the organization, strategy, management: development history is blackboxed into entities supporting the design process as described. Therefore, even though the authors of "concept design" speak of an elaborate staging of different elements as a means for enabling concept development in a joint effort, it would be difficult to apply this in practice, as the effect of the different elements would impact on the understanding of how concept design is supposed to take place. Such imposing elements could be passing a gate system, how to acquire resources throughout the organization, or how company and market strategies affect the development possibilities, to name but a few.

Figure 8: Front end of innovation from a design engineering perspective. The actors involved in creating new concepts are focused on the development of the concept. But they are only focused on looking at the actual product that they do not include the surroundings such as the organization or innovation process held in the company.

The case company had focused their conceptual understanding on the basis of the above frameworks. However, making the understanding of the holistic concept the revolving aspect for development was difficult, as there were many other factors and entities informing the development possibilities.

CHAPTER 2 - APPROACHING

I will, in this chapter, account for the research process and how the empirical data has been obtained. I will describe the choices that have gone into the perspective that I have chosen and how the case study framework was scoped.

RESEARCH QUESTIONS

In the confusion and difficulties in navigating between the different perspectives of front end of innovation, I understood that I needed to take a step back and study, understand and discuss it in alternative ways by changing and explicating the ontology for this thesis. All of this leads to a conclusion of the scientific question in focus for this thesis:

> *How is front end of innovation enabled in an established development company?*

By identifying and studying the construction of actors and how and why actions appear, the second research question is:

> *What characterizes the enactment(s) that enables front end?*

When embracing the many levels of complexity and ambiguity, allowing there to be many perspectives on what appears to be the same subject, then we have the foundation for understanding what really is at stake. This is seen in relation to not only having to focus on identifying management concepts or development tools, but also an understanding how they are performed when introduced in a mature development company. I will, in this thesis, describe how enactment of the proposed development constitution allows certain actors to perform front end with specific agendas, and also how enactment can be performed strategically as a means for staging alternative development agendas.

RESEARCH PROCESS

The focus for this thesis has changed in accordance with conducting the research. I have allowed what I have studied to play a part in shaping and reshaping that which is understood, which entails empirical data as well as literature and conferences. The project has primarily changed due to my self-awareness of my stance as a researcher that is embedded in finding the ontological perspective for the thesis. Officially, I have been part of a larger research program: TempoS – *Performing temporary spaces for user driven innovation,* a research program funded by the Danish Strategic Research Council. There has, through this program, been some activities and seminars on various subjects that I have attended. However, the timing has been somewhat inconvenient for me, as the main activities were at the very beginning of my project. At that time, I did not know what I know now, and some of the discussions then seemed too abstract for my project focus and the content was difficult for me to incorporate into my further work.

My background and experience working with this field and this problematization have influenced how I have approached the research. In many ways, my master's thesis served as a pre-study, which is why the first conference paper I wrote was based on the empirical data from this project, albeit without it being noticeably explicit at the time as it was in this paper where the development of the sensitizing concepts was made. This paper, by Brønnum and Clausen (2013), was presented at the 2013 International Conference on Engineering Design (ICED) in Seoul, and essentially consisted of a presentation of concepts that, from the data, could and would aid an alternative discussion of front end. It was interesting for me to present it, and the feedback from the peers at the session was constructive.

SENSITIZING CONCEPTS

Sensitizing concepts have been applied as a means for engaging and understanding the field. To ensure a common ground for understanding what is at stake when looking at the front end of innovation, both for myself, as researcher, and my informants, I applied sensitizing concepts such as those as described and proposed by Blumer (1954) and by Bowen (2006). Blumer (1954) describes the need for sensitizing concepts to relate the theoretical world to the empirical world, and, to let this gap be facilitated in a smoother manner, he describes a sensitizing concept as a concept that will give the user of the concept a sense of reference and guidance in approaching the empirical instances. Blumer (1954) is concerned with unravelling the social

science discipline and making the transition from theory and empirical data trustworthy as the collected data are not definitive and well described concepts, but merely provide a guideline for the path of understanding. Charmaz (2003:259) has described sensitizing concepts as "those background ideas that inform the overall research problem." This reference is aligned with the research design of this thesis in the sense that the master's project preceding this thesis project has, as described, transformed an understanding of the subject and has vaguely drawn the contours for understanding the research field from a new perspective, one in relation to the presented sensitizing concepts and thereby embedded understandings. This is to be seen in contrast to an analytical concept that refers more precisely to what can be derived as common for a class of objects with a clear set of specifications that will allow for benchmarks against other phenomena. Sensitizing concepts are a terminology stemming from the discipline of grounded theory, through which I have been inspired in this thesis. I have let myself be motivated by the notion of sensitizing concepts as they can be aligned with the epistemology of this thesis. Ontology- and epistemology-wise I see no obstacles to the adoption of sensitizing concepts in relation to the study of relations and translation of different socio-material entities.

I introduce the specifics of my applied sensitizing concepts when introducing the case study. As an aid to describing and reading this case, I will describe how these concepts have been developed and how they have come to be. I hope they will help give the case descriptions depth and tenor in relation to the further analysis of the possibilities for the front end of innovation and the future discussion of the current situation in the case company.

The sensitizing concepts have played a role throughout the entire research process. The understanding and ordering of the dynamics according to the sensitizing concepts has allowed me to study these concepts in practice, present and discuss them with various peers, review the available literature, and write about my findings. The sensitizing concepts have been developed during the research process, and are not to be understood as prefixed and predefined conceptions or an affinity to a phenomenon that is in focus for the study. The sensitizing concepts aid in facilitating the field research and thereby how to perceive the translations of entities into actor collectives. In the conference contributions that I have made during this thesis, I have explicitly worked with understanding and detailing these sensitizing concepts, each time making them more applicable for aiding in understanding the front end and how they can help enlighten the opportunities for alternative approaches for

enabling it. They have therefore played a dynamic contribution that has changed over time according to the knowledge obtained.

I have applied sensitizing concepts in my understanding of the field. The specifics of the sensitizing concepts applied will be presented and unfolded in relation to the case description, but they are a result of my understanding of front end that has been shaped throughout my training as an engineer. When discussing the scoping and the potential of the PhD project with peers, principally my supervisor, it has revolved around obtaining meaning in relation to the sensitizing concepts and how they were understood in the field and the available literature. This is not explicitly, but rather in how others had come about describing conceptions or understanding that could do or say something that informed the sensitizing concepts.

I have attended conferences during the PhD, and the papers that I have presented show a progression of how the sensitizing concepts have informed my understanding of the field. It is during my writing of the conference papers and other written material for PhD courses that my understanding of the conceptions have evolved as I have engaged in discussion with the front end literature, and it is through those processes that I have encountered many frustrations in relation to grasping the perspectives for front end solutions proposed by manifold scholars. When Googling the front end and researching literature there are many different perspectives problematizing this field, and what I found unsatisfactory was that they did not recognize each other. Furthermore, the problematization was, from my perspective, often in line with something to which I could relate in my fieldwork, but for some unknown reason (at that time) the proposed solutions for 'fixing' front end seemed fundamentally lacking. In my experience from the field research, many of the proposed solutions would only displace the problem, or throw up another one. Consequently, in bringing an ANT ontology and what this induced, what I will propose in this thesis is not a plug and play solution for the improvement of front end activities. Instead, I will propose an alternative perspective to how to enable the front end, thereby entailing a different solution space in which to look for change.

CHOOSING THE CASE COMPANY

The case company represents what I will refer to as a mature development organization. By this definition, what I mean is a company that has an established and explicated front end. The front end needs to be something that the company prioritizes and works with in a strategic manner. The definition is made because there is a great difference between what the front end is in a small entrepreneurial company, and what it is in the mature development company. Referring back to my story and how I became interested in this field, it was the fact that there were so many tools, processes and definitions for how a smoothly operated front end should be run, that made it interesting to understand why it was yet so difficult to operate. The interesting thing for me to study was then the mature development organization that has the resources and knowledge to facilitating the *front end after the book,* (whatever version that may be) but still experience difficulties.

Maturity is also aligned with the fact that the company had already tried some of the textbook organizations, tools and methods for conducting a good front end. The exact nature of what has been tried is not the important aspect; rather, the important aspect is that they have tried something and therefore have a reflection on what front end can and cannot do. Maturity is also shown in the fact that they want to be studied, as I think it indicates that they think they have something worth being studied.

My former supervisor at the Technical University of Denmark facilitates concept workshops where he (and colleagues) teach developers in companies how to work with concepts and, in this respect, how to think of a concept. The front end division of the case company had just recently attended these concept workshops when I initiated my contact, and was interested in broadening their horizon in regard to further possibilities for development within the front end discipline. I met a concept development manager at a *front end interest group meeting*. It was a fellow PhD student who had established this group in relation to her PhD, and the manager from my soon to be case company joined one of these meetings to participate in the discussion of front end possibilities. The latter also shows that the front end was an explicit topic of focus at the company.

I established a contact at the meeting, and, after following up, I was invited to their offices, where we discussed the timing and scope of such a research study. I made it very clear that I wished to spend as much time in the company as possible while the field study took place, and I was then assigned a desk in the division that I could use even though I did not have any specific activities

in relation to the research. This was a very deliberate choice, as I did not want to be an anonymous face walking in from the street conducting interviews. Instead, I wanted to get to know them, and a good way to do that is to eat lunch together, joke across the office desk, and chit chat at the coffee machine.

METHODOLOGY

The intention with the field study was to understand, from multiple perspectives, what front end of innovation is, and how it is performed and enacted. Being an established development company with years of experience and market success, it is a business that has defined, analyzed and developed variants of innovation perspectives over time. This thesis builds on a qualitative study that informs a case study. The case study is referred to by Yin (2014) as: "(…) it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented and with what result". One of my main contributions with this thesis will lie in the momentum and the detail of the case study. I have conducted the case study with what Yin (2014) refers to as a relativist orientation, thus allowing for multiple realities to exist. This is opposed to a more classical perception of case studies, where the common orientation leans toward a realist orientation, perceiving that there is only one reality to be studied and reported upon. The intention with this ethnographical approach is therefore to understand and research in depth what front end of innovation is in this specific company, and not to generalize what front end is in an absolute manner concerning all so-called mature development companies. I will try and establish a perspective and conceptualization on the possibilities for enabling the front end. Using the thoughts behind Yin's case study again, the case study then provides a framework for me to understand and investigate a contemporary phenomenon in depth and in the settings of the real world (Yin, 2014:16). The case study allows me to understand the phenomena with its important contextual conditions given that, prior to my studies, I did not see any reasons for studying the front end out of context as an isolated phenomenon deprived from context relations.

Working with the ANT ontology, the ethnographical methods would allow me to precisely study the relations and interaction of the socio-material by observing and interviewing on the same matters. I will draw attention once more to the sensitizing concept introduced earlier as a concept. These sensitizing concepts play a key role in gathering the data, and in sorting out the data for analysis.

GATHERING DATA

From previous experience, the topic of front end of innovation and how to create better conditions for performing it is a difficult matter for many employees to discuss, one of the reasons being that it is difficult to work with and the organizationally provided supporting tools, such as processes and methods, are experienced as frustrating. Therefore, it became important for me, as researcher, that I became a familiar face in the company as the intention was not only to know what they said they knew, but also why and how they knew it. Furthermore, I had previously experienced that there are, in an organization such as this, the *correct* corporate answers, and then there are the answers to questions that may (or may not) challenge the organizational way of doing things.

This resulted in a research setup, where I spent a minimum of two days a week over a period of effectively seven months in the company as an active observer, inspired by the concept of a participatory observer such as described by Spradley (2016:53). The participatory observer is, to the eye of a stranger, just as much part of the context being studied as everyone else. The difference, however, lies in the actual person doing the observations and partaking in the field being studied. I did not have a role in the project on equal terms as the rest of the team, but I did take a participatory role in relation to the company and actively took part in the ongoing discussions in regard to the front end, and even facilitated them as I observed the actors. Much like the example Spradley (2016: 54) offers on a dual purpose and a participant at a party who is there to engage in the activities (or even initiate them), I was also there to study these specific activities and how and by whom they occurred. I had my daily basis in Concept Development (CD), where I had my desk. It was through the manager of CD that the possibility for doing a research study in the company had become possible and she had appointed a project that would serve as the empirical base for my research. Moreover, I was given a main supervisor representing the company who would later become an important sparring partner to me in understanding some of the initial findings. One of the two days was allocated on the day were the case project staff all had a dedicated project day. They would gather in the morning for breakfast and a briefing. Some of the days spent in the company I would then follow on to some of the project activities or meetings, or I spend the time observing the daily activities whilst working on related assignments. This allowed me to participate in the informal dialogs that are present in a workplace, something that can otherwise be difficult to grasp as it is rarely explicitly present in the

minds of the employees and cannot be asked about in an interview. Gathering valuable information and creating an understanding of the company has partially taken place whilst waiting at the coffee machine or informally over lunch where many daily problems and points of frustration were informally discussed amongst colleagues. These observations were noted as field notes on a daily basis and served as the framing for the interviews, which were of a more formal structure. Spradley (2016:55) explores a notion of explicit awareness in the participatory observation role that I find to be of interest when actually understanding my position in the company. I earlier stated that it has previously been shown to be difficult to get informants to elaborate on front end and how it is enabled due to the fact that, in many instances, it occurs by force of habit and best practices. However, my explicit awareness of the activities that I was partaking in or observing forced me to pay attention to actions that were not tangibly available to the informants to contextualize into front end alignment. By my observation and having explicit awareness of, for instance, strategically planned lunches or choice of tables for breakfast meetings allowed me to enter into a dialog with my informants in regard to the rationale behind these specific actions. In addition to following the case project, I participated in departmental meetings to gather insights into how development work in the front end of innovation was carried out from a broader perspective than just the case project at hand. This project to which I had been assigned turned out to be a special case, which I will elaborate further upon later in my case description.

Position in the company	# informants	# interviews
Executive Management	1	1
Vice Presidents	2	2
Section Leaders	4	5
Project Managers	1	1
Concept and Product Developers	7	8
Business Developer	2	2

Figure 9: informants

Formally, I conducted 19 interviews with 17 informants, with a duration of approximately one hour. Of the 19 interviews in total, 17 were conducted using the same interview guide; a semi-structured interview guide with open-ended questions divided into themes regarding work practice, company understanding and the front end of innovation. The interview guide has its

backbone in the understanding of front end based upon the sensitizing concepts that provided a perspective and a terminology that I needed in order to set up the dialog regarding the subject matter. The open-ended questions led the dialog in many different directions, which was the intent, as it was important to let the informants focus on what they found interesting and relevant in relation to how they saw the front end. The interview guide has evolved slightly, but it served more as a guideline to which topics to discuss with the informants, and not as a checklist. The role of the participatory observer also played an important part in the interviews, as some of my informants would refer to events that they knew that I had participated in or refer to discussions that I had observed. Furthermore, the participatory observations led my understanding of the questions to change in accordance with the informant in focus as well as a progression of coping with information. All interviews were conducted in Danish, recorded, and later fully transcribed as a tool for analyzing the complete dataset and to make it available for me to discuss with my key informants and supervisor. From the interviews, it was clear that the topic was a sensitive subject for some of the informants, as some answers may conflict with being loyal to the company as it is perceived a good employee should be. In this regard, the position in which I had placed myself – becoming a familiar face in the company – was important, as well as the chosen format for the interview, as the semi-structured interview guide with open-ended questions allowed the interview to be more like a conversation, and the informants free to scope the interview in the direction of their choice (Kvale, 1997). A smaller issue was the fact that the interviews were recorded. To my surprise, several of the informants explicitly continued the interview after the Dictaphone was turned off, stating that now it was turned off I can tell you so and so, which were the more critical reflections of how the company conducted business, especially in regard to how the front end of innovation was allowed or, in this respect, restricted, in guise of management and strategy. Some of the information gathered in this respect has been recorded in the form of observational notes, and served as framing for asking new questions to other informants, who could then elaborate or disregard the questions.

The first informants were selected based on the department in which I was anchored and the case project. Developers and managers from the case projects were the first ones to be interviewed, and it became clear that there were many other interesting and relevant informants across the organization that I needed to interview in order to grasp and understand the broader perspective of what front end of innovation was perceived as at the company. The interactions of some key informants led me to be interested in others,

and, with respect to the ANT translation process, it was thus interesting to explore how certain strategic interactions were performed. It also aroused my interest in the remaining divisions of R&D, as it seemed that there were several key employees that had a great stake in defining and characterizing the front end of innovation as it was performed in the front end division to which I was assigned. A key interview was the interview with the chief operating officer (COO) as it was used to test partial conclusions and put these into perspective from an executive management point of view. The COO is responsible for the management of the operations such as research and development, service and production and is part of the executive management. Furthermore, this COO had years of experience in the company and had a track record of several successful products on the market along with patents developed in relation to his time spent as a development engineer in the company. He is considered to be, by many employees, a very gifted engineer who they respect due to his accomplishments. Another very important aspect of making sense of the data gathered in relation to understanding how front end was enabled (or not) was quite frequent discussions with my main contact person. In these meetings I would present and discuss findings and, in this instance, the data would be enriched into informing my sensitizing concepts and the understanding of how front end was enabled would gradually evolve.

LEGO SERIOUS PLAY WORKSHOP

The formal data gathered was concluded in a half-day workshop based on the Lego serious play described by Møller & Tollestrup (2013) with key informants who, during the process, all showed great interest in further defining and actively developing the conditions for working with front end of innovation. The workshop was constructed to facilitate the many different perspectives that had surfaced during the fieldwork, thereby confronting the informants as a group with the different perspectives and creating a shared space for discussion and progression. The choice of Lego serious play as the framing for the workshop was based on two parameters. I wished to stage a workshop where there was a certain level of experience for the participants and, therefore, an educational aspect in performing facilitation of workshop in a *new to the company perspective*. Lego was chosen because of the thematics that were in focus for the workshop. In past experience, and as Møller and Tollestrup (2013) describe, the Lego serious play workshop is a creative tool to help the participants in clarifying difficult and non-tangible subject matters such as how the front end of innovation is enabled. This was put into perspective by also focusing on the implicit problems and possibilities for

alternating front end performances in the future, and what this would entail. This lies in the embedded value of a Lego brick, where it is only the imagination that defines the limit for what is allowed. This was clearly shown in the first exercise where the informants were asked to build and describe the challenges of working with front end of innovation as it was experienced by them in their everyday lives. Some informants built and expanded their take on the problems by applying many different images and metaphors that would later be applied as shared understandings for certain problems. As an example, one of the developers described the challenges as a zoo, personalizing the stereotypical images of some of the animals and elaborated the story of how the internal struggle in the company took place through the metaphor of the animals.

Figure 10: Lego Serious Play workshop. The difficulties of front end were by one developer portrayed by referring to the personality and hierarchy of the animals.

As an example, the management was characterized as the crocodiles and the developers as cows and horses; the crocodiles would often just overrule and devour the new initiatives similar to the role they have in nature. Furthermore, the cows and horses were, later on in the discussion, used actively as they would turn away from the management as a means of doing things according to other agendas than the management's immediate agenda. I will, throughout the case description, elaborate further on some of the findings from this workshop, and this example is to illustrate how Lego, as a tool, worked in the workshop. Due to very insightful discussions, the timetable had to change slightly, and the second round that was thought also of as being an individual round, was changed to a group exercise where the informants were asked to build new possibilities for the front end of innovation within the company based on the discussions from the previous round. Again, it became clear to me as the facilitator how many different perspectives and priorities of problems and opportunities existed in relation to the informants' job titles and the section in which they were employed. These differences of opinion largely

made the outcome and the shared solution they had to build a result of the lowest possible shared common interest. It was a great compromise to satisfy the majority, instead of building new bold and provocative initiatives that I knew some of the participants had in mind, which could have served as a springboard for future work. I am not evaluating the solution as being bad as such, but rather that the process for bringing forth new ideas was compromised due to time issues and the change in program going from first building the visions for the front end of innovation individually and thereafter building the shared vision. It was unfortunately as if there was a lack in the reflection and the nuances in the discussion, as a discussion like this often takes place on the premises of the informants talking the most and the loudest.

However, an informal evaluation of the workshop some days later left the impression that each informant had gained some new insights into how the problems and opportunities influenced the possibilities for conducting front end development in a more explicit form adapted to specific agendas. This would allow each individual to carry on more reflectively; maybe not as a joint unit with a shared vision, but rather as individuals with a foundation for a better understanding and a terminology to engage in the discussion of the implicit problem of staging for the front end of innovation in mature development organizations.

Figure 11: Examples from the Lego workshop. On the left hand side a developer has built her perception of front. She explained that she felt that they sometimes were shooting with very big guns in order to hit very small targets. That their intentions did not align with what was actually produced in the end. On the right hand side the front end process is built as an obstacle court where the goal is to navigate to the Promised Land where the castle awaits.

PROCESSING AND MATERIALIZING THE DATA

All of the interviews were fully transcribed and, in the process, initial themes aligned with the sensitizing concepts were identified and discussed with my informants and my supervisor. The process of processing the empirical data has been performed in several steps. The process of writing and processing data and theory in smaller parts has been fruitful for the process of contemplating the full picture of the empirical data, and discovering the diverging perspectives on the front end of innovation problem. Furthermore, working systematically with analysing the data, which will be explained later in this section has helped in problematizing the front end of innovation in an alternative manner. The conference papers, as mentioned earlier, represent a process of ordering the data and the argumentation, as well as trying out and discussing the argument among peers which, again, has been of great importance in order to understand and frame the revolving perspectives that will be presented here. Likewise, different PhD courses have served the same purpose, focusing on grasping specific theoretical perspectives to which I had to relate along the way, and, in this manner, put my data into different perspectives.

In the process of transcribing the interviews, initial themes unfolding the sensitizing concepts were discovered on an ad hoc basis. These initial findings led to a latent search for similar statements that could evolve this specific perspective, put alternative nuances to it or contradict it in some way. This process has entailed that the analysis of the data is ongoing and forms part of a dynamic process where theoretical abstractions and understandings of material have formed an understanding of data, and vice versa. As situations described in the empirical data have been informed by putting it into perspective using different theoretical framings for understanding it in a togetherness and thereby a full story, the story of how the ontology and epistemology has become more explicit in the discussion of the data has indeed helped frame the understanding of the field and the data in order to write this thesis.

The formal analysis of the data, transcribed interviews and notes from observations, has been processed through an identification of related themes constructed on the basis of the sensitizing concepts. The different themes have been discussed during the process with my supervisor along with the analytical aspects of the themes. These rather informal conversations will, of course, have taken a part in framing the understanding and discovering key quotes

and statements. The process of making sense of the data has been facilitated in conjunction to reading into the literature and, in this sense, they have informed each other.

A pattern had developed and there seemed to be two main categories, and the identified themes were then tentatively tried in these categories. The first category concerns how informants perceived the rules for front end of innovation and thereby how front end of innovation ought to occur in the company. The second category is more closely related to how informants would act based on these rules, whether passively or actively. These categories become important for the further analysis of the data; as they were transformed and processed into what I will later elaborate on as being the *development constitution* and the *enactment* possibilities, both in regard to how the front end of innovation is performed in the company and how it affects the development opportunities.

MY ROLE

The epistemology is understood in a relatively circular hermeneutic perspective, given that the sensitizing concepts hold and represent my pre-understanding of the front end, thus serving as the basis for investigation in the hermeneutic circle (Birkler, 2011). My sensitizing concepts have helped set the stage for what I have studied and how I have studied it. If I had conducted the study with no sensitizing concepts, the result may have been different. However, I would not at the given time have been able to do that as my story had led me to become overly involved in the matter. It would have been uncomfortable for me to force myself not to know what I knew and the interviews would probably not have been as authentic as is the case study. Along with my informants, I felt highly invested in understanding how the front end could be enabled by alternative means.

The sensitizing concepts also inform the narrative of the case and is written in a form which, if not entirely after the book, then is at least inspired by Geertz (1973) thick description, where I do not only present what is said and done, but also why, in relation to the context. This type of presentation thus also informs the methodology, as it takes part in contextualizing the material in a certain way.

Furthermore, I was investing in the process while I was in the field. My presence and the fact that there was someone asking questions who would have the employees reflect on their work day and processes induced an effect

of some sort. Vikkelsø (2007:305) points to the fact that the ANT researcher posing in an ethnographical field has difficulties in being anonymous and silent. Furthermore, I saw myself as becoming a sort of ally to some of the informants and taking an active part in the field, and my changing focus along the process and asking more questions challenging the embedded development practices in the company clearly had me speaking on behalf of a specific agenda. I did not take sides, but embracing certain problematizations placed emphasis on the problem side of many established processes. Spradley characterizes this as a natural path in serving humankind. When conducting ethnography, you cannot ignore the use to which the research is put. Spradley (2016: 17) describes it as: "cultural descriptions can be used to oppress people or to set them free". In my research I became an ally of some of my informants because I listened to them and acknowledged their problems and insights. Spradley (2016) describes this as natural, because we ask someone to study something in order to be able to state something else. The natural reaction to this is to try and inform this and desire answers. I do not feel biased in my research, but it is something of which I have been explicitly aware. I have tried to report to how front end is enabled without judging what is right or wrong, but instead focus on the reasoning and the actions behind the different choices.

CHAPTER 3 - THEORIZING

I have already touched upon the scientific approach for this thesis, but I will, in this next section, not only introduce actor network theory as the foundation for the philosophy of science and thus the ontology for the conducted research, but also how the epistemology of the field is performed. In so doing, I hope that I will be able to conclude some of the loosely applied descriptions of my research that I have applied to date as a means for describing the process. I will introduce the thoughts behind ANT; however, the focus in this thesis is not to discuss ANT per se, but rather to apply ANT. This is why I will introduce and describe the translation process, as it serves the purpose of putting front end in an alternative perspective.

ACTOR NETWORK THEORY

The main scholars of ANT are Bruno Latour, Michel Callon and John Law. ANT is a response to the human centric sociology, and has been developed and elaborated by many scholars over the years, but it is still Latour, Callon and John Law who are recognized as the main proponents of the ideas behind ANT. (Bruun Jensen, Lauritsen, & Olesen, 2007)The concepts behind and the argumentation for ANT begins in the clinical laboratories, where Latour and Woolgar (1986) demonstrates how scientists working in the laboratories construct scientific facts by creating agency through objects and the actor network(s) of the laboratories and thereby meaning. That the scientific facts are constructed by heterogeneous actor networks stands in contrast to the understanding that they are not constructed, but rather that they simply exist and are there to be found and to be studied. ANT is, in this relation, different, as it is the construction of agency that is in focus and that the construction of agency takes place between actors, human and non-human, such as the example with the laboratory studies. As an example of an opposing perspective to ANT could, in my regard, be the case of the front end in engineering design. In engineering design, the focus is not on the construction of agency, and the actors are not accounted for. In engineering design, development is understood on the basis of prescriptive understanding of previous occurrences. Development takes place because of the presence of various elements in a process with a purpose, but the construction of agency (meaning and ability to act) in relation to, for instance, a new product, is not described as constructed, but rather as being there.

In ANT, there is a relational (material-semiotic) definition of objects: Any thing, object, actor, or phenomenon is nothing more and nothing less than its relations (Callon, 1990, Jensen, 2003) Actors (human/non-human) are anything granted agency by other actors. Actor networks are heterogeneous and relate to human and non-human elements in their quest for agency. The translation process is essential in the understanding of ANT, and the sole premises of how ANT contributes through a perspective that is different from, for instance, sociology or engineering design.

The translation process depicts how actors are formed (how an actor is given agency and thereby the ability to act) Callon (1986:366) describes the translation process as "(…) the identity of actors, the possibility of interactions and the margins of manoeuvre are negotiated and delimited". I will now briefly describe the translation process, as it is an important aspect for understanding the dynamics of ANT and therefore what ANT can and cannot do. Callon (1986:359) introduces the translation process as "four 'moments" that are discerned in the attempts by *key actors* to impose themselves and their definition of the situation on others". Furthermore, the notion of an obligatory passage point is essential and in the story of the scallops (Callon, 1986) it is described as part of the problematization and is to be understood as problem/question to which all entities and actors in the network need to relate. For obvious reasons, the incentive for relating to the subject matter may be different, but nevertheless, it will be there or be ignored, which also relates in some way. In brief, the scallops demonstrate that there are multiple actor perspectives as to why it is important to further understand the process of cultivating and harvesting scallops. The translation process is demonstrated by following how the key actors mobilize an actor collective that, despite their differences, are gathered in an actor network providing the key actors with agency to negotiate on behalf of all the involved actors.

THE FOUR MOMENTS OF THE TRANSLATION PROCESS

The four moments are problematization, interessement, enrolment and mobilization. This process of translation has the purpose of enabling the 'spokesman' of the collective to represent its interests, making the collective/actor eligible to influence other actions and actors. (Callon, 1986:203)

Problematization is where a common ground for an action is made, and a development agenda is, in my case, made indispensable for those willing to listen, or for those whom it will affect one way or another.

Interessement: "to interest other actors is to build devices which can be placed between them and all other entities that want to define their identities otherwise." (Callon, 1986: 371) Further down the text, Callon generalizes this process as: "the properties and identity of B are consolidated and/or redefined during the process of interessement. B is a result of the association which links it to A. This link disassociates B from all the C, D and E's (if they exist) attempts to give it another definition (…)". Interessement is strategic and important as it is in this step that the actor collective will establish a foundation for how to enter the problematization, and the different actors are made interested depending on how they relate to the problematization at hand. B's problem is then manifested and explicated as it associates it to A, but also how it disassociates from the rest, and so forth. Interessement is about finding the most suitable others with which to play in order to establish the strongest foundation.

Enrolment: describes the process of further building the relations that, in the interessement, have made an entity eligible and interested in entering the actor network. Merely being interested does not entail a commitment, and the enrolment is thus building itself strongly in relation to other prospects, in this case C, D and E. In the enrolment, the actor collective will build the foundation for distinguishing itself from others. "To describe enrolment is thus to describe the group of multilateral negotiations, trials of strength and tricks that accompany the interessements and enable them to succeed" (Callon, 1986:374). The actor collective will seek to make the cause of the network more explicit, and thereby "turn the problematization into a series of statements that are more certain" (Clausen and Yoshinaka, 2007:68). Enrolment is, in the light of the scallop case, understood in the examples of the key actors trying to enrol the actual scallops into their actor collective. In this process, the researchers must first negotiate the currents, the towlines, visitors of the bay and parasites in order to successfully enrol the scallops.

Mobilization: "Who speaks on behalf of who?" (Callon, 1986:214). This process relates to enabling the actor collective key actor/spokesperson to represent and manage the many perspectives and agendas of the involved. Clausen and Yoshinaka (2007) describe the role of the spokesperson in an actor collective as having "(…) to know what all relevant entities are and want. Then, these entities have been mobilised". In this regard, the spokesperson evokes all

interest in the group and will act as a unified collective/actor. In the scallop case, *mobilization* is what frames the understanding of how the three spokespersons (researchers) come to speak on behalf of the scallops, the fishermen, and the specialist. At the beginning of the case, the agendas seemed very different for the three, but, through the translation process, the researchers have managed to make themselves spokespersons for a collective speaking on behalf of all three entities. As Callon (1986:217) explains: "all these actors are first displaced and then reassembled at a certain place at a particular time"

The ANT translation process provides a detailed look at how the concept of an actor emerges, and, more importantly, the dynamics that are involved in making things perform. This is part of the fundamentals in the ANT understanding that I will further apply as the basis for the ontology that is present in this thesis. What ANT brings to the table in regard to the front end is that it allows me to study how the front end is being constructed and what in the constructions is important in understanding how it can perform. By studying what is constructed by the actors in my field, I will be able to study the field across the different perspectives of the front end, as I do not study any particular concepts where the actors partake in predefined roles.

ANT AS AN ONTOLOGY

The naive illustrations of Robinson Crusoe presented earlier are my own tool in helping me understand and grasp the notion of ontology in practice. As I have struggled with this, this constitutes me coming a long way on the academic path.

Latour (1999:19a) describes how ANT, when conducting ethnographical field studies, allows the actors to know what they know. It is us, as researchers, who should learn from them, not only what they say and do, but also why they say and do as they do. It is us who do not know what they do, it is not them who lack the tools and ability to articulate what it is that they do and say.

This is described by (Latour, 1999b), in the Buena Vista case when he studies how the rainforest is being studied by scientist. In this piece, Latour further lays out the foundation for understanding ANT as an approach for going out in the field, collecting data that subsequently needs to be analysed and given meaning before a conclusion is drawn. Circulating references have many details and nuances towards understanding how it is the researcher who makes sense of the rainforest by collecting, transporting, analysing and concluding

these different soil samples. Circulating references depict how the ethnographical practice helps produce new *pictures* through which to better grasp existing practices. We need better pictures, the rainforest is too big, it is too complex for us to understand as it is, but producing new partial pictures to complete the rainforest allows us as researchers to know about it. The details in the study being performed can make the complex practice (what we are trying to understand) more tangible by sorting out how actor collectives in the shape of a soil sample are given agency by applying it with different references such as coordinates and measurements of the composition.

ANT as an ontology with a focus on studying and understanding the actors aligns well with performing an abductive study, where my pre-understandings of the field take an active part in gathering and understanding the data collected. Furthermore, I use my pre-understanding for the ordering of the data. The abductive study is described by Birkler (2011:82) as unorthodox, as it is not associated with a scientific protocol of methods. It is considered to be pragmatic and practical applicable approach, which in the sense of ANT and the premises of studying the actors in their environment, is relevant for this study. This is similar to the way in which the soil samples are given agency through the process of referencing them in various contexts. I have used the sensitizing concepts as a way of navigating into the field and studying how the sensitizing concepts are further informed by the actions of the actors studied. This abductive process of applying the sensitizing concepts as a way of stating a hypothesis of the field being studied in order to gain new information that re-informs the sensitizing concepts has been an important aspect in the epistemology. The process could continue and, as Birkler (2011:81) claims, an abductive study will always "only" conclude with a maybe, where further iteration of this circular process could identify alternative aspects important to a different conclusion.

ANT suggests that the issues of interest for study are composed of both human and non-human actors and that society is understood and should be perceived as a practice that continually needs to be unfolded and redefined (Fuglsang, Bitsch Olsen, and Rasborg, 2013) Fuglsang further describes ANT as being a way to understand and enable explanations of cause, motivation and structural considerations in social science (Fuglsang et al., 2013:351). This is precisely what makes ANT attractive, as it allows me, as researcher, to study the field in a broader manner than I had previously been able to, focusing on predefinitions of how the new front end of innovation development tools should, for instance, be designed.

I will not speculate on what drives the individual, but instead focus on the actor collective and the agency constructed that influences the possibility for front end.

When Latour (1999a:18) speaks of these non-human actors, he refers to the behavior that defines things, i.e. behavior performed by humans that could not have existed without the things (Fuglsang et al., 2013). The key to applying ANT and utilizing it into saying something interesting is to be able to identify and define important actors based on their actions and thereby their performance as a whole. The creation of actor network collectives containing human and non human actors; and through these collectives identifies the agency that will enable actions. (Law, 2002) and thus performance is interesting when studying the enabling factors. Latour (1999b) has, in circulating references, shown how the actors need a *something* in order to say something else and understand something new. In this case, it is the soil sample that represents a *something* to which the researchers can relate, talk about and refer. The study is based and begun by giving meaning to something else, by referencing it into something that has meaning constructed by something different.

MULTIPLICITY

ANT is not socially constructive, but constructive. The constructions furthermore are not definite but can be understood from many perspectives depending on the perspective of the researcher (Mol, 1999). The power in ANT does not, in this case, rely on the individual, but rather in the whole entity of various actors constructing meaning via and by each other (Fulgsang et al., 2013). It is, furthermore, different from system theory, where the revolving issue is to study the actor, who is placed in a predefined role in a structure and system with rules. It is the nature of this particular system that has relations, they are predefined, e.g. the teacher and student.

Latour (1999a) describes ANT as being everything all at once, and Mol (1999:74) describes ANT as useful because reality itself is multiple, which, in this research, is definitely the case. It is captured in the presence of the many different perspectives on front end, where neither perspective is right or wrong. There are many experienced realities depending upon which chair you sit in, and the difficult thing is that we, as researchers, would like to only say one thing. Mol (1999) points to realities as being enacted and performed, not observed. This again indicates that it is the choices of the different actors

imposed in a process that makes the reality that we, as researchers, can try to capture. Different arguments are mobilized in several directions, as they are used and equally misused to create and enact different realities for us to study (Mol 1999:80). ANT acknowledges the multiple sides of reality (whatever that is), and allows us to maintain the dynamics even when putting the discovered into text and explanations. (Latour, 1999a:22)

A classic example of the complexity of a practice is that of the instalment of the speed bump (Latour, 1992:166). The example has many dimensions but the important point is that the speedbump was installed as means for slowing down the cars driving on a road. The bump should signal that the driver should slow down and be perceived as a sleeping policeman. The resulting effect of the speedbump enforces that the cars slow down, not because the bump signalled that it was the best solution in regard to safety, but because the driver did not want to damage his car. This example, even though it is brief, illustrates how something is constructed with the intention of obtaining a specific performance, but is perceived otherwise and is translated into a different meaning and purpose, and thereby action. Neither one of the versions is more correct than the other, but they make up a perspective that would be relevant to know if a study of new instalments for slowing down traffic was to be conducted. As I will propose for front end, we need to know why the actors think of the front end as they do in order to aid in enabling it.

The goal of this thesis is to influence how front end can be enlightened differently and thus discussed in the future. The line of thought put into the solution and the way I went about thinking of a new front end perspective is inspired by Stengers (2005:1) who describes the process of studying and understanding something as beginning with slowing things down, taking a step back, and looking at the seen in a different perspective. “How can I present a proposal intended not to say what is, or what ought to be, but to provoke thought; one that requires no other verification than the way in which it is able to “slow down” reasoning and create an opportunity to arouse a slightly different awareness of the problems and situations mobilizing us?”. This is opposed to the approach where you dislocate the same problems again and again by reproducing the difficulties of the front end by introducing alternative models, or continues to disregard influencing factors such as actors. I have tried to slow down. I slow down and begin to wonder, and in this wonder I will study what enables front end, not from a predefined perspective on front end where I, for instance, think that the front end needs to be processed, but rather by studying the actors involved and their actions and capabilities. ANT will, in this thesis, help me to describe the field, but also to

produce and elaborate on concepts that inform a different way of coming to an understanding of what the possibilities and opportunities are for enabling the front end of innovation.

Vikkelsøe (2007) has, in her article, demonstrated how ANT is applicable in the practical organizational world. The case study she presents concerns studying the work practices of a hospital. The director wishes to get *some of that Prospective ANT* in the hope that it is more operational than traditional ANT analysis. However, the case shows that, by conducting a classical ANT analysis, there are many operational insights to be found. What ANT brought forth in this case was that multiple realities exist; multiple understandings of the work processes. What ANT helps facilitate in this case was to enlighten completely different problems and possibilities by studying and understanding the field in a different manner, ascribing meaning to other *things* than what could have been brought forth by studying, for example, how effective a given process was, or was not.

EPISTEMOLOGY

When I look up the word epistemology (and I have done so many times) I get easy clear-cut definitions, but when I search for the practical impact epistemology has on research, it is difficult to find examples that will make it fall into place (I am a trained engineer so I actually do like boxes and how-to guides).

Epistemology is how we know what we know. Episteme is the theoretical knowledge we have aside from what we have studied and is, in this sense, abstract and detached from reality. An example of this could be the understanding of a disease and its treatment. The disease is often detached from the actual patient when discussed and understood, and the episteme is then the theoretical knowledge from where and how we understand the disease (Birkler, 2011: 41)

In hermeneutic epistemology, the knowledge obtained is always on the basis of pre-understanding of the field. The hermeneutic approach recognizes that the researcher already has a perspective on the subject, and this perspective is incorporated into how the field is approached (Birkler, 2011: 101). The hermeneutic approach can be further understood in relation to the phenomenological approach. In phenomenology, the individual and the object being studied are not considered to be separate. Phenomenology then

explores how the individual understands a given phenomenon from the objective stance in which they position themselves (Birkler, 2011:105).

As I am approaching my research with an explicit pre-understanding of how my research field can be understood, I lean toward the hermeneutic perspective as I, through my sensitizing concepts continually inform my understanding of the field, and through this new understanding, the sensitizing concepts are further developed.

Epistemology deals with how I understand things, and I will try and explain how ANT informs what goes on in the reasoning of the seen into understandings. Epistemology describes how to obtain knowledge on that being studied, is it something that can be observed, such as a phenomenon, or does the meaning need to be discovered behind the words and the actions, such as in hermeneutics.

An epistemology related to the ANT ontology revolves around understanding how entities are represented by translation in actor collectives and are given agency to act in a given instance. The focus is not, therefore, on explaining a certain phenomenon in a generic form by pointing to principles of construction, but rather to describe and understand the process of acquiring the agency that lies with an actor collective (Fuglsang, 2013:357). The ANT-based epistemology allows me to know something about why an actor collective performs as it does, because the interesting aspect is how and where agency is known. In (Latour, 1999b) Buena Vista case, he demonstrates how scientists, in a process of translation, ascribe agency to soil samples. The samples are, as entities, only soil. However, in order to be circulated in the world of science they are labelled, packaged, given geographical significance and measured. The interesting aspect of this case is to understand how the soil gets to perform as it does when circulated amongst researchers in the laboratory, and it is by looking at the translation process of the soil sample as the revolving entity for the actor collective. The soil sample is empowered by the translation process because of the agency it now holds in the actor collective and the relativeness it has to actor collective giving it agency. Czarniawska (2014) elaborates on the possibilities there exist by studying objects (things such as the soil samples) instead of humans as it can hold information in regard of many different things. However it is also important to remember the fragile state of such networks, and the soil samples and the plant are easily transformed into plain simple soil sample without any significant meaning if all of the ascribed coordinates and values are misplaced.

THE EPISTEMOLOGY OF ANT

When perceiving the world as consisting of semiotic actants and socio-material actor collectives, the question is how I make sense of this world. To make sense of what I am studying and seeing in the field, I am interested in understanding the actions taking place in the translation process and the relations that exist between the entities being studied. These relations are dynamic and under constant negotiation in relation to what the actor network can or cannot do. The construction of actor collectives is not straightforward, and tensions in one actor network can easily cause displacement and change the agency of an actor collective or construct another. I have used sensitizing concepts to define and engage with the research field, this has been of great aid in grasping and identifying the complexities of the actor collectives, and, in this aspect, studying and understanding the different translations that have ascribed meaning and agency to actor collectives. There is, however, a dilemma when I use sensitizing concepts for this study, as ANT is based on understanding the fiels on the premises of the informants. However, there is a delicate balance in my use of sensitizing concepts, as I have, in a sense, used them as soil samples that have been given agency throughout the process. The sensitizing concepts were, at the beginning, not well defined, and were a means for me to communicate the nature of the research study as opposed to studying how a new development model should look.

APPLYING THE TRANSLATION PROCESS

Epistemology in ANT-based ontology lies in relating and reasoning the translation process of the involved actors. I thereby understand and give meaning to things/actors/entities/collectives on the basis of understanding how they have been translated, how agency appears and thereby how they perform and act in a dynamic sense, or enact in a proactive sense. I study the intentions of the different actor collectives, and understand and make sense of how the actor networks have been constructed with what purpose and on what basis. I do this by engaging with the field, asking open ended questions with a basis in my sensitizing concepts that, in this instance, also influence the field being studied. I then also take part in the construction of sense in relation to understanding the process of giving agency to specific actor collectives as the reflections made by my questions also informs the construction of agency.

Merely due to my previous projects, and having worked with this field in the way that I have, it would be difficult for me to apply phenomenology as my epistemology, as I would not be able to research a phenomenon such as front end with a so-called *clean slate*. My sensitizing concepts have, from the beginning, given me an idea of how to understand the field but, overall, how to approach the field in the manner in which would enable me to do my research. The sensitizing concepts have served as my pre-understanding and have, throughout the research, been informed further, and on this note informed the research continually throughout the process. I therefore characterize my epistemology as a circular hermeneutic relational epistemology. The hermeneutic circle refers to the process of building on the knowledge and pre-understanding of the field (Birkler, 2011:101). The relational dimension frames the ANT perspective of understanding the research field as it is the relation between the studied construct's agency and meaning, which in the ANT ontology is the interesting aspect to study (Fuglsang, 2013: 45-50). This epistemology allows me to study the processual dynamics of how actors are constructed and why they act. The how: Studying how actor collectives are constructed and thus how agency appears. The act: studying and understanding how the actor collective by agency can impose different possibilities on what is performed. Agency and the power to act are balanced out between all actors. (Garud and Karnøe, 2001) describe how "Any actor's capacity to formulate options and visions depends on their specific socio-material entanglements". The socio-material entanglements lead the focus to be on which key entities are informing the actor collectives' agency, as it has a direct consequence in relation to how the actor collective will engage with other collectives, i.e. how they are displaced or re-constructed.

I study what the informants know, what they say and what they do as a means for understanding how they take part in creating agency for a given actor collective. In my research process, I study key actors and their strategy for constructing strong actors with agency that can induce and impose change in other actor collectives. Just as with the scientist as key actor in (Callon, 1986) story of the scallops, I take part in constructing and defining actor collectives, by defining or redefining objects or actants to be circulated amongst the informants of this thesis. Such an object can, in this sense, be the development model that exists in the company, or the sensitizing concepts that have informed how the front end is perceived throughout the study.

I identify how my informants strategically position objects that are enacted and serve a purpose of creating agency and the ability to perform front end in a certain way. I therefore define and study actor collectives that work toward

the same goal while applying the same strategy. In this case, it will be shown as different strategies for obtaining what each actor collective perceives as their front end goal. By identifying key actors, the process of translation was identified in the sense that I followed the strategic acts that eventually enrolled others to the collective, informing the agency. This was achieved by observations, interviews and informal dialog. In this sense, it is important to say that the construction of actors as collectives was not an explicitly known thing, and it is therefore myself who ascribed meaning to the translation process by understanding what is said and done in applying the principles of the translation process and the struggle to understand the construction of agency. Therefore, in order to understand how meaning and sense are constructed, the translation process is deconstructed by observing the development work and the negotiations that take place here. By observing, I can identify certain actions of actors that are latent or explicitly performed in accordance with other strategies, but affect the current development process. Furthermore, the simple process of interviewing has given me the opportunity to engage in a dialog with the field, and, in this context, construct meaning with my informants on deliberate choices made in the development process. By following my informants and their *reality*, the insights in regard to the field that I will present are true for this case because it is the experiences of the informants (Fuglsang, 2013:45-50).

I make sense of several actor collectives that may, in time, be opposing actors as they displace different meaning to the same entities. Making sense of the field entails studying how the actions of certain actor networks become. Not explicitly by identifying the steps of the translation process, but rather to understand the dynamics of the translation process in practice. This involves studying what enables different entities to say and act as they do, what they are trying to accomplish, and how are they accomplishing it. In an organization there are multiple activities going on, there are multiple projects, and multiple agendas. I will therefore claim that it would be close to meaningless to only understand one situation in the pursuit of understanding the front end. There are multiple actor collectives that inform what the front end is, and it is these multiple constructions of diversity that exist when depicting a field though ethnographical methods.

To summarize, the epistemology based on the ANT translation process and the circular hermeneutic relational perspective allow me to understand and describe multiple front end possibilities as these are the experiences of the informants with which I have engaged. Furthermore, the multiple understandings that exist in an actor collective are also worth highlighting, as

it is, much like the scallops, not always the case that actors are working towards the same goal and agenda (thereof an actor collective) will have the same reasons for doing so. This is an interesting aspect in the translation process to understand, as it provides nuances to the difficulties of front end, as the level of ambiguity rises with the presence of multiple perspectives.

CHAPTER 4 - DISCOVERING

FOUNDATION FOR THE CASE STUDY

I have, in the previous chapters, now accounted for front end and the multiple perspectives that can be found working with this type of development. I have also accounted for the philosophy of science in this thesis as a response to bringing forth a different perspective of the front end. I will now present how the front end will be investigated and explored in the case study.

FRONT END PERSPECTIVES IN MY CASE

The case company has a well-argued organizational structure for handling both exploration and exploitation (Leifer et al., 2001). The different development tasks are orchestrated in divisions, but still as fluently as (Dougherty, 2008; Griffith & Dougherty, 2001) proposes, as the projects at hand are the revolving issue for how the actual organizing is staged. The CD division has implemented an explicit holistic concept understanding based on the works of Hansen and Andreasen (2002, 2005) have proposed. Innovation management is present in the front end in several regards, but most importantly is the development model that is implemented throughout the entire R&D process. The development model consists of phases that indicate the progression of the project, and is also a tool for management to measure performance. I will elaborate further on these perspectives throughout the case study, as it is important to pay attention the multiple perspectives on front end which is induced by the three front end perspectives.

ANT AND FRONT END OF INNOVATION

ANT grasps (or are able to handle) the complexities that are perceived as being part of innovation and its processes by utilizing the understanding of networks and agency to embrace the multiplicity of innovation. (Akrich, Callon, Latour, & Monaghan, 2002). Front end if innovation is not accomplished by the works of one person of the content of one idea. Front end is to be part of a network that in a joint effort (through agency)will navigate through the possibilities (Baer, 2012) When studying how front end is enabled with an ethnographical methodology it is, however, as mentioned above, very difficult to only focus on the problems as perceived from just one perspective

as it is a networks intertwining many perspectives. Even in such a perspective it quite easily shows that the experienced problems are intertwined across the different perspectives for front end. I will not, however, claim that I have covered all of the aspects for understanding the front end, but I have studied front end in a practical manner as a means for re-discovering what it is enabled to do in a company setting.

(Legardeur, Boujut, & Tiger, 2010:249) present a practical case study of the early stages of an innovation process. "(…) our aim is to address this issue in a pragmatic way based on the empirical study of an industrial situation (…)" The objective for the study is to elicit the complexities in the interactions of actors when new concepts are found. Based on the works of ANT scholars, innovation is not studied in regard to understanding innovation as the production of new products, but rather how the organization adapts what is new to the organization. With this study they propose of a characterization of the required conditions to foster innovation in the early design phases, by providing prescriptive guidelines for developing innovation processes. It is the ontology of ANT that is interesting and what enables innovation to be perceived as a process rather than the new product. "In the ANT both humans and artefacts are seen as part of the social world. The ANT may also have the potential to indicate how new artefacts may impact work practices" (Legardeur et al., 2010: 250-251).

The front end is crazy, it is fuzzy, it is complex, it is filled with uncertainty and ambiguity and it is supposed to be this way. Front end studies in ANT terms are limited in number, but Legardeur et al. (2010:256) describe antagonism between the exploitative and the explorative projects as they co-exist and influence how new ideas are perceived. "(…) during early development phases, exploring new alternatives can prove very difficult and off-putting as the actors proposing the new idea find themselves devoid of knowledge in certain areas where traditional solutions that rely on better understood technologies within the company are already relatively stable and advanced." This exemplifies one of the problems that appear over time when studying front end in an ANT perspective, and it opens up for the understanding and the dynamics of actors trying to balance the two (exploration and exploitation).

Legardeur et al. (2010) further argue that ANT allows you to study an innovation process as a series of tensions between different actors and, through doing so, reveal the organization in a new light that emphasizes the evolution of the structure as a network, while at the same time considering the

object – the task at hand – as a key actor. They conclude the ANT study of the front end as revolving around three main dimensions in which change occurs in the innovation process when fostering new technology (the object for innovation). The first dimension reflects the organizational dimension, and describes the tensions between various actors to provide a destabilization of the structures of the organization. Actors are fighting for the establishment of new networks which also serve as the driving forces for action in these processes, based on the actors' intention and interest. The integration of a new concept was feasible due to particular key actors (boundary spanners) that propagated the concept throughout the organization facilitating the various interests present. The second dimension deals with the creation and sharing of knowledge, which was essential when working with new concepts. Key actors are important in this process of bridging and translating knowledge to accommodate the insecurities of other domains. The third dimension is concerned with the assessment of the products, which is difficult to say the least, when dealing with a new product (the product of radical innovation). The assessment of such a product should be transformed in accordance to the innovation process, but it was not natural behavior. The case showed how new products that entail new knowledge and approaches did induce a need for an assessment system different from the one applicable and applied to the incremental innovation projects but this was not accomplished. Radical and incremental innovation are two different things and should therefore be treated and evaluated on the basis of that.

Reflecting the impact it has had on understanding front end, Legardeur et al. (2010:258) describe innovative processes as being a: "(…) complex, fragile and uncertain process. Innovation cannot win in a single dimension. To succeed the new concept must be robust at the level of the organization, the design practices and the technology". In his paper, the analysis is concluded by proposing a software solution that is intended for the initiator of an innovation project and serves to aid in the navigation of the three dimensions when planning for an innovation project. However, in considering the case study for this thesis, I can see some difficulties in implementing a new software interface for accommodating the difficulties for working with early stage innovation. I have, anyway, not studied such a case, so I will not elaborate further on this subject, as the analysis and proposal will be different in this thesis, and will focus on the multiple front end and how key actors have the possibility to act.

In line with Legardeur, I see the interesting aspect that ANT brings forth when studying the front end is the focus on the actors. ANT supports the

desire to study the actors, the intentions and the actions, when the focus is to understand why front end is experienced as being difficult despite the many initiatives that are accessible. ANT is interesting when taking the step back and trying to understand the stakes for front end on a new note. The normative approach and description that is to be found in the front end perspectives described earlier is only interesting when trying to understand how we would like front end to be, not when we try to understand what front end is. I do not disregard any of the many innovation models, processes or methods described earlier; my point is simply that they do not allow us to understand how front end is performed, and what makes this performance. They have other purposes, but enabling of front end is not one in the singular understanding. In order to understand this we need to also understand the actors present, and the actors are what is lacking. By studying the actors' navigation of the various methods, organizations and processes and thus enabling front end, we will add another dimension; a multiple understanding of how to reflect upon the front end in the future, and thereby how to look for an alternative means for supporting this development discipline.

I have now accounted for front end, how it is perceived in the literature and how it is defined for this case study. Moreover, I have described how the philosophy of science matters in rethinking front end, and how ANT in this relation informs both an ontology and epistemology that is different from the normative perception of front end.

CASE

I will, in this section, present a case that more or less complies with the prerequisites of what Andreasen et al. (2015) are asking for in the design process. It will have the structures and the organizational divisions that are asked for by Dougherty (2001, 2008), and holds well-defined processes and development models such as those described by Tidd and Bessant (2009). The company has an official strategy and clear scope for where and how to conduct explorative and exploitative innovation. Even though all this is present, I will demonstrate throughout the case how front end still struggles, and has a difficult time actually working with the exploration. I will try to understand the development discipline of front end across the different perspectives and focus on the enabling of front end in practice, despite or in regard to the various staged supporting processes and models.

I have chosen to anonymize the case company even though it was not my intention from the beginning of this collaboration. I will thus refer to the company either as the case company or the company. Due to personal circumstances, this PhD has taken a bit longer to complete, which has resulted in the data presented not being accurate according to the current situation in the company. Furthermore, I experienced during my field research that I had received insights that, in different instances were compromising to other informants at some level. Specifically, this is in relation to the many different agendas of the informants and is therefore deemed potentially damaging to them. Furthermore, the decision is based on the fact that the company has, since the field study, radically restructured and therefore would no longer benefit from the case directly. In several instances I found myself restricting the narrative of the case as well as the pre-conclusions due to the fact that it was too conflicting and had the potential to create controversies that were of no direct benefit to the development process in the company. The specifications for the products and the markets in which the company operates are, as such, not important, neither is the content of the projects studied.

INTRODUCING THE COMPANY

The case company is family owned and employs more than 1300 people worldwide. Of these, approximately 300 of them are based in the headquarters where the field study has taken place. The company is a market leader and primarily works with B2B. The definition of a mature development company lies in the structures and the organization behind it. The case company has a

well-defined organizational structure for development, a well-defined development model and several divisions each responsible for a piece of the development taking place before launching a new product. There are established expert groups across the organization as a means for knowledge sharing and sparring as well as an established well-described charter for strategy, development goals and company culture.

The field research was anchored in the R&D division which, at the time of the research, was structured as shown in figure 12. The base for the field study was in the division of Concept Development (CD) that is part of Business Innovation (BI). I had a main contact person in CD, and it was as a starting point that I was to study and follow her activities.

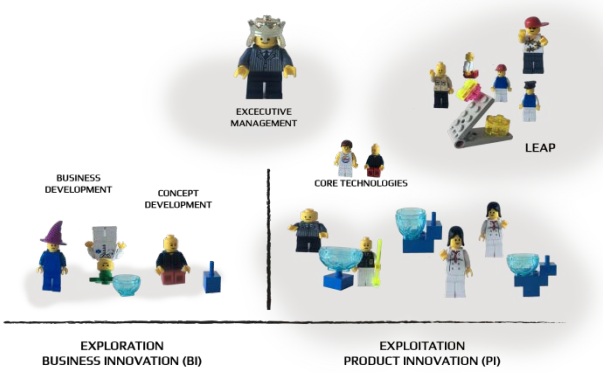

Figure 12: Overview of the Company divisions applicable for this case study.

THE ORGANIZATION

I will describe the part of the company that I encountered when conducting the field study. It is safe to say that I have not covered the entire company, nor will I claim that I have done so. The main part of the R&D is located in headquarters. Executive management is also to be found here, along with the heart of the organization where the decisions are made. I engaged with R&D, where the main development activities took place, although they do have R&D activities located elsewhere in the world as well as works with external developers. This said, the main development activities are facilitated in this division. There are two main development divisions that have each their own focus for development.

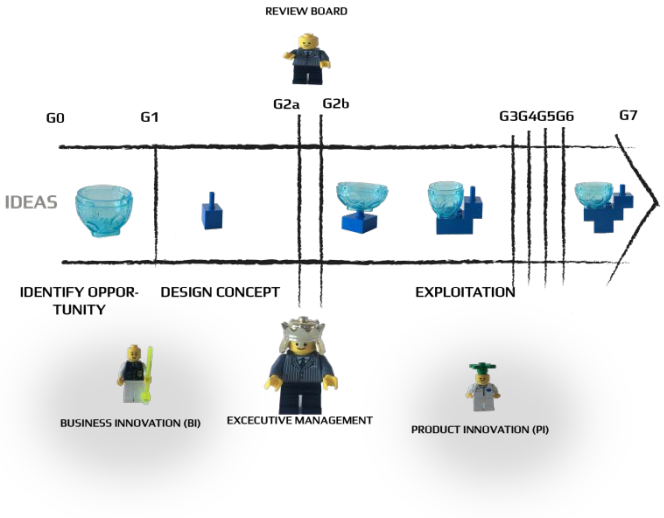

Figure 13: The development way. The company development model and process.

Business Innovation [BI] and Product Innovation [PI] are, from a management point of view, two equally important development functions which serve two different roles. BI has two individual departments: Business Development [BD] and Concept Development [CD]. These two departments work with the early stages of development and innovation and make up the front end in the case company. BI is responsible for bringing forth new ideas and concepts to feed into the product portfolio and maintain and expand the market share. PI is then responsible for executing the development from concept to launch. PI receives the initial concept idea from CD in the form of a concept report, and will, on this basis, continue the development into the final stages of the product. BI has approximately 30 employees in contrast to the over 200 employees employed in PI, indicating, in some respects, the relation between explorative and exploitive innovation within the company. Development is organized according to a development model (figure 13) inspired by the classical Stage Gate model described by Cooper(1990), where the focus for development is placed in relation to the predefined gates that act as a guideline for a generic development practice and thereby how to reach the goals. Front end is, in the literature, often described and referred to as a discipline not included in the Stage Gate process development. It is therefore facilitated in parallel with, and as an alternative or addition to, the development enclosed and facilitated in this model. In the case company, the

development is orchestrated according to *the development way* (edited) the company process development model that holds gates from project initiation at G0, where the project is launched until G7, where the product is launched.

The development way is divided into two main sections in accordance to the divisions of BI and PI. BI owns the gates up until G2a and PI the gates from G2b up until launch at G7. The main focus for the case study is the development activities that occur up until G2; the predefined stages for front end of innovation. The development activities from G2b – G7 are black boxed to conclude exploitive development in this case study and analysis in accordance to this. The COO describes the two development disciplines by putting emphasis on the importance of differentiating between them based on the end goal and mindset in each of the two divisions.

> *"When you are in a development function, then you will get a task to perform; here is a specification for this and this and this. It is like going to school, there you will get an assignment. But that is not like the concept developer, they will get a problem definition, the customer wants this and the ability to measure this, okay what do we do? Everything is up for grabs, so mentally you have to be able to work with very open-ended questions."*

It is an explicit decision to divide development into the two types of categories as it provides two widely different perspectives and focuses for development. The intention for the organization for development is the allocation of dedicated resources for one type of development one place in the organization and dedicated resources for exploitive development in another. There is no one division that is more important than the other; therefore, no one development discipline is more important than the other. It is thus a necessity that they both exist in order to perform good product development, as they complement each other.

Business Development (BD) owns G1, and the focus for passing this gate is to present and demonstrate a feasible business case for a potential new idea. A rule of thumb at this gate is that you have to present a business case with a factor 10, concluded in the simple fact that your concept will, within a specific amount of years, have contributed to the revenue by a factor of 10 of the development and production costs. The years included in the business plan vary depending on which market and product line are in focus. In theory, the

G1 represents a screening of the feasibility in the business plan at a given market with a given product. The phase from G1-G2 is owned and facilitated by CD, and the focus for passing G2 is to build the concept that fulfils the business plan passed in G1 to the passing criteria stated in G2. CD works with the more technical aspects of a potential new concept, which is to be understood in relation to the business perspective that exists in the phase G0-G1. In general, the focus for this technical conceptual development lies within what the company refers to as the classical traditions that consist of mechanics, electronics, software and optics. Characteristic for the development work performed by CD is a more holistic approach and perspective to development than the one that exists in PI.

In theory, an idea will arise somewhere in the organization, a process which will be described in brief later in this section, and is selected to be initiated into a project by the managers of BI consisting of the managers from BD, CD and the head of BI. Following this, it will be shown whether there is potential and a feasible business plan in the idea, and, if so, this idea will be conceptualized into a material and technological aspect that also includes interaction with the users. However, it is, in practice, difficult to maintain this clear segregation of business and concept development to be contented into two separate phases. The development activities are often initiated parallel to the development of the business plan, as it is difficult to make calculations based on a product that is unknown, as is the case for new concepts or new markets. The projects that are facilitated in BI are, in the case company, referred to as the front end, i.e. the division working with the explorative innovation development. Some of the projects are characterized as facelift or next generation projects (incremental innovation projects) that are easier for BD to make upfront calculations for; as they have a clear market and existing market they are benchmarked against. Furthermore, BI also holds the mandate for producing and facilitating projects in the front end of innovation of the more radical character, that are even more difficult to make business plan predictions for, as the market and the product are new and the risks and uncertainties are great.

In CD there is, for obvious reasons, a variety in the competencies amongst the employees, as their task is to produce the conceptual work and to take out the risk of the total solution, which clearly entails the evaluation of the product as a whole. CD employs chemists, optics, electronic, software and mechanical engineers as well as business developers and UX designers. However, beside their specific domain competencies they are chosen because of how they work with problems and their mindset. The employees in CD are characterized by

their manager as having a more holistic understanding of what goes into working with development than, for example, the employees in PI.

THE BACKGROUND OF THE COMPANY

Prior to the field study, the company had gone through a leaning of their development process. This leaning of the processes was anchored and initiated in PI and facilitated from there. The aim was to make development more effective and reduce costs, thereby increase revenue. They focused on taking out the risks of the projects as early as possible as a means of creating more effective development and reducing the development cost. This is one of the bearing rationales behind the construction of the development model - development way and distinguishes between BI and PI as two different development divisions governed by different managers. By focusing on identifying and mitigating the risks as early as possible the aim was also to reduce the cost of development, as the cost increases as the project progresses. *The development way* was introduced as a tool for this leaning of the development, and the gates are formulated in accordance to this. The development way does not, however, dictate how to think development or how to execute nor which elements should be included. Instead, it focuses on taking out risks as the project progresses. Formally, the gates only consist of optional checklists and guidelines for what to consider in relation to the project, informally, and the perception of the gates, is that it consists of several other elements in regard to conducting development.

This leaning of the process has created a tension between the creative element for radical new concepts and the effectiveness of development. It has, however, precipitated an increase in annual revenue and a streamlined portfolio, as this was the priority in the process. The portfolio was optimized and existing products were upgraded, facelifted or replaced by a next generation product aiming at the same market. In conjunction with upgrading the portfolio, a focus on platform technology was also introduced. Thinking within technology platforms such as described by Hvam, Mortensen and Riis (2006) works in close alignment with the leaning process. By this, I mean technology platform concepts focusing on creating and maintaining a technology that can serve as a platform for several products. R&D then primarily lies in the maintenance and further development of the platform, as this will benefit several products. The idea is thus to think of development in regard to how existing technology or existing technology with minimal adjustments can lead to new product(s).

Furthermore, there was an induced focus on how many new products PI should launch per year, which initiated a roller-coaster of retrospective calculations in the system resulting in key performance indicators (KPIs) based on numbers of projects passing the gates. The rationale was that PI, at the time of the field study, had to launch two new products at G7, which was then measured into CD having to provide five G2s annually and BD providing ten possible G1s. Departments and some managers thus had KPIs that were based on the reaching of these goals/

To summarize, this leaning of the development organization resulted in an effective development process and the execution of development projects that were aligned with the maintenance of the product portfolio. Furthermore, a technology platform paradigm for thinking about new development within R&D was introduced. An understanding of success was measured as a fixed number of product launches per year which was concluded in gate performance evaluations formulated in KPIs under the remit of key employees or divisions.

CASE TERMINOLOGY

The sensitizing concepts applied in the field study will be presented here as they have been applied in situ in the field study in order to understand the current situation that is being studied. Throughout the detailed examples I will show how the sensitizing concepts have informed the understanding of the examples of front end, as seen in the case company. The interview guide has been developed with the understanding of the sensitizing concepts in mind. The questions served the purpose of trying to make my informants elaborate on the three notions, not by applying the specific notion, but rather to ask questions that would allow them to discuss the development challenges in the company in a way that would broaden my understanding of the concepts. Furthermore, I have specifically applied the concepts in some of my communications with the company. When presenting myself and my project I had briefly drawn up the relationship between the concepts as a means for serving as a foundation for what I was studying, and a reasoning for why I was asking the questions that I did. It made sense for the time, and some of my key informants bought into the premises, and applied the sensitizing concepts as their own terminology when explaining and elaborating different matters.

Lastly, the sensitizing concepts were used for myself, as researcher, to keep track of my findings along the way and to continuously try make sense of the

data I received. It was a work- in-progress tool for gathering and sorting data, as well as for communicating it to my informants. Furthermore, I have initially worked on unfolding the concepts as a proposal for understanding front end. I did this in the papers Brønnum and Clausen (2013), where the idea of explicating staging was an important perspective to follow.

SENSITIZING CONCEPTS

Development space

The notion of a space is abstract, and is defined by (Clausen & Yoshinaka, 2005:45) as being a sociotechnical space that is not predefined but negotiated and a crucial dimension in differentiation of whether certain actors are included or excluded. (Clausen & Yoshinaka, 2007:68) "Approaching socio-technical issues and interaction involving actors allows for the staging, ordering and localisation of change processes (their delimitation and opening)". By considering the development space to consist of socio technical matters I can thus study how change and different development opportunities can appear. The sociotechnical space is considered to be a sensitizing concept as opposed to a well delineated tool. The sensitizing aspect facilitates what can or cannot take place within the space, and it is because of which actors are included and how this is put into perspective that informs which solutions are made possible and how they are shaped. (Clausen and Yoshinaka, 2005) The space is temporary defined by the discourses and the actor network collectives in place, by temporary I do not mean vaguely defined, but it exists as long as the actors involved have this common and shared interest to keep up, and maintain the space. In a previous article by (Brønnum & Clausen, 2013) we have tried to define what the notion of space helps us to understand and attend to in relation to front end. And in (Brønnum & Clausen, 2015a, 2015b) I have worked more closely with describing how the development opportunities are dependent on the development space and its configurations. Spaces have a premise of ANT ontology. The development spaces are temporary and exist only because of a shared common interest that is the basis for the network as it is the actors and agency that define what a space can and cannot facilitate. In the case of development, it can be the scope of a project. It is safe to say that there are human actors placed in a project team that will participate and be enrolled in a network informing a space and thereby the development opportunities. Furthermore, in relation to ANT there will, in this space, also be non-human actors present. (Clausen & Yoshinaka, 2009) Describes and argues that certain devices are enacted thus taking part in

configuring the development space and its development opportunities. Devices as a concept is not the focus point in this case for understanding the development opportunities. I have focused more on actions of the actors, and how they create strong agency by e.g. utilizing and including device like objects in the development space. The easiest actors to identify in the development space are those influencing the development opportunities directly, but the development space is sensitive to all other actors such as development traditions, KPIs of middle management, the world economy or the likings. All these actors also influence the development space and thereby the development opportunities as they are or can become part of the actor collective imposing agency in the development space. The space is temporarily defined and exists in parallel to a development assignment. The actors informing the space will, however, often partake in several spaces at the same time. Relations of different actors within the space will not stop existing because a development space is no longer present; it will most likely exist in another development space, or will be translated into another network, enacting a different meaning in a different development space.

Staging

Staging is a notion taken from the world of theatre, i.e. staging the stage for where the play is taking place. If, however, I replace play with development, then the staging refers to the work performed allowing for the development to occur. Staging refers to the planning of a space or the orchestration of development opportunities by inviting and enrolling the right actors into the space. In figure 14 a novel understanding of the role of staging in relation to staging a development space, and thus development opportunities, is presented.

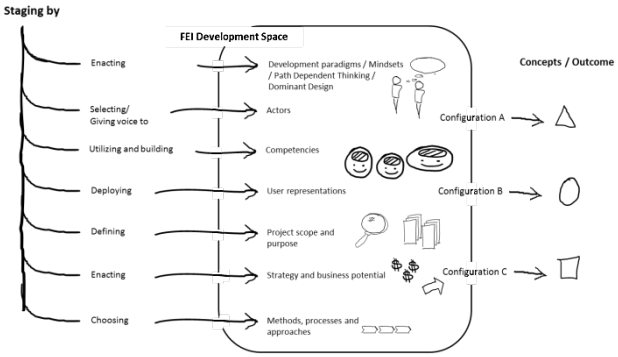

Figure 14: The sensitizing concept of staging. This initial model was presented at the ICED conference in 2013 and is inspired by Mogens Myrup Andreasen and Christian Clausen.

The figure was initially inspired by a work-in-progress drawing between Mogens Myrup Andreasen and Christian Clausen and presented as a paper presentation at the International conference on engineering design (ICED) in 2013 in Seoul (Brønnum and Clausen, 2013). However, it also provides a convenient overview of what is at stake when talking about staging a development space. The figure represents initial thoughts of the sensitizing concept of staging, but has later changed radically. The basic thought behind it however remains, as it depicts various actors being staged in a space, and depending on the specifics of the actors and elements certain configurations thus concepts are made possible. The figure in its original form has later been published in the book by Andreasen et al. (2015). Based on the ANT perspective and understanding of networks then staging can be intentional or unintentional (explicit or implicit). Staging is the dynamics which enable certain actors to be part of a network and certain actors to be excluded. However, there is still the possibility that excluded actors influence the perceived development space by entering another actor network that influences the space unintentionally. Furthermore, an actor can influence the

development opportunities within a space by existing, not because it is included in the space, but because the actors included in the space will have to relate to the exclusion. In ANT, this will simply be explained by the forming of an actor network. Staging can include the role of a project manager, but it will always also go beyond him or her because it is embedded in the foundation for development in the company. The development space will be staged implicitly, therefore influencing the development opportunities disregarding the project manager's active role in staging. Staging is about deciding which actors are important for development, and how these actors should act, for example, by staging certain development paradigms or development tools in the space.

Configuration

Configuration is the result of a staging. When a development space has been staged, that is that the right (and wrong actors) inform a development space, a certain configuration will appear. The configuration can, just as with staging, be intentional or unintentional. There may be an intended configuration prepared for a development space, but it is the specific elements staged in the space that determine how a development space will perform due to its configuration. Configuration is what the space is programmed to do as a result of its elements. All elements in the development space inform the configuration, but the impacts of the configuration are neither linear nor flat. Some actors in the development space will have greater agency, for example, defined by a hierarchy existing in the organization or mandatory processes (obligatory passages point). Some actors may be speaking on behalf of organizational anchored incentives and may, in this instance, have an advantage from the perspective of configuring the development space into a certain direction. Configuration will, in a development space, be a constant negotiation between actors and a translation of possibilities. The role of, for example, the project manager is important as he or she holds a clearly defined mandate for challenging the configuration of a development space by staging it differently, thus changing the configuration.

CASE EXAMPLES OF STAGING FRONT END

Basically, development is staged in different ways depending on which divisions are in focus. I will, in this paragraph, describe different examples of projects working within front end of innovation to enlighten the different strategies that are performed in pursuit of reaching the end goal. I will describe how CD produces new conceptual projects, how they perceive development, and what is regarded as influencing which type of development is performed. Likewise, I will introduce another front end example referred to as Leap, which is an alternative to the front end activities that are performed in CD. Through this example of front end, I will put focus on alternative possibilities for staging, and thereby how the temporary development spaces are configured in different ways, thus allowing for different development possibilities.

In the two rather detailed examples of front end that I am about to present, I will show how development has been staged, and how actor collectives are constructed to have agency enabling them to act.

FRONT END PERFORMED IN CONCEPT DEVELOPMENT (CD)

The insights of how front end of innovation is staged and taking place in CD will, in this example, be described from a more generic perspective with examples from different historic projects to illustrate of what elements front end of innovation development work consists and the possibilities and problems that come along with this. I therefore focus on how the informants perceive the task for bringing forth front end of innovation development and the possibilities for doing so in regard to what influences these possibilities, how, and when.

When I first began the field study I arrived in a company that had recently moved into their new building, an innovation center placed on a road named and established in the name of the founder of the company, and a tribute from the municipality to the company and its year-long success. The building was not completed yet, and it smelled new. My initial contact with the company was through the manager of Concept Development (CD), who I had met during a network meeting hosted by a fellow PhD student, she briefly introduced me to the developers in CD and then we sat down for an initial meeting with my formal contact person, a UX designer in CD who would become my main informant and whose work activities I would follow, as I would have one of the projects upon which she was working as my main case

in the field study. The choice of project was based on my desire to study an ongoing project and was selected by the manager of CD as an interesting case in regard to showcasing front end of innovation development in the company. It later proved to be that exact case that would frame a different understanding of the research, which is interesting as I did not have a say in the specifics on which projects I could study. I was given a desk in the division, immediately opposite a mechanical engineer who had been with the company for more than 30 years, and was also assigned to the project that I would have as my main case study. CD, as a division, had just changed desks, as they had recently been mixed with the employees of BD, in the sense that they were placed as a joint division of BI. However, the storytelling reveals that BD employees were unsatisfied with the situation and wanted to be placed together as a result of having lost some identity as a division due to changes in management.

Another important factor for my understanding of the front end activities and understanding of CD is mentioning that my initial contact, the manager of CD, began her maternity leave around the same time as I began the field study. I have, however, conducted one prior interview with her to obtain a manager's point of view of the front end of innovation taking place in her division. Her replacement has, however, been quite significantly involved and is regarded as a key informant in understanding front end of innovation in the division, both the current situation but also how future framings and understandings for development could take place. The temporary manager for CD was, however, relatively new to the company, and was parallel to my field research in the situation that he too had to understand what the divisions' tasks were. What was front end, how ought it to occur and how could it occur in the future? As briefly mentioned, BD had also recently received a new manager, through an in-house promotion, and BI were in the process of getting a new head of division, a recruitment that turned out to be a candidate from outside the company. Accordingly, the foundation for how the front end of innovation activities and development were orchestrated in BI as a whole were up for re-evaluation, as the line of new management all were all inclined to make some sort of change in relation to cementing their presence and visions.

STAGING THE DEVELOPMENT SPACE IN CD

Business Innovation (BI) owns and works with front end and what is referred to as the first two gates in the development model – the development way. I

will, in this section describe how development is perceived in this division by including observational studies and interviews with employees in the different sections. I also include employees placed elsewhere in the organization in regard to their perceived understanding of the outcome of the development work practiced in CD in relation to their expectations for the development stemming from this.

Referring to the sensitizing concepts, I will describe how a development space(s) is staged in CD and what type of development it configures by drawing attention to the elements that are staged explicitly and implicitly in the space. In order to understand how the development space in CD is configured and what it can then perform, I will draw attention to my interviews and the observations made in the field, as it has allowed me to gain insight into the developers' perception of what characterizes the type of development possible within the development space of CD.

THE DEVELOPMENT MODEL – Development way

To set and understand the explicit stage for front end of innovation I again draw attention to the official mandate that BI holds by the organizational structure for development, and thus the ownership of the first two gates in the development model. A great focus for front end is placed at the G2 gate, because this is where the project will change its nature from being an explorative project into being an exploitive one in a different department. The G2 gate thereby constitutes the outcome and work conducted in CD. The development way is only a model visualized on the intranet, and something to which new employees are introduced as part of getting to know the company. Even though the development way is formulated as a set of guidelines and not as a set of rules for how to perform development activities, it nonetheless takes part in configuring the development space, as these guidelines embedded in the development model represent an understanding in the division for how you are expected to perform development in order to pass the G2 gate.

Another important aspect of this officially non-restrictive development model is that it builds on best practices from previous projects. This is not what is uncommon, but the pitfall is that it captures the *"bad behavior"* in perceived best practice, or that it narrows the perceived solution space into consisting of what has previously been done. For example, one developer with expertise in chemistry points out that the built-in checklists that exist at the gates only represent the domains that historically have been the core business of the

company, such as mechanics, electronics and optics. For someone working with chemistry it can thus be difficult to make another field of expertise count in the prioritizing of the development tasks leading up to a gate passing.

> *"They (the project managers) do not always know what you are doing, so if there is time I go to the lab and test things. That is if I am allowed to buy the chemicals needed. That is one of the positive sides of others not knowing exactly what I am doing. – The freedom to try out things. It can be difficult to explore other aspects than our core competences because it is a change in thoughts. If we as in Polly (a project) have to measure something new, then we might need some new chemistry, and therefore we have to make some larger changes in the hardware and the electronics. Then I am told: can you not just reuse what we have? – aaarggh, and then you feel a little like you are in the way, but at the same time it is good to be challenged, both ways, but it seems like we have to design something to put into the box, and not designing the box to fit what we have designed.*

Embedded in the development model and its gates is the reviewing done at the gates; the G2 gate where the project changes its nature and ownership is particularly interesting. At the first two gates, the focus is on taking out risks in the project showing that the concept and idea is feasible, and it is the developers' task to investigate the potential in the idea and concept to show its feasibility and its potential in the market. The reviewing is done officially by a selected board consisting of management from both BI and PI, and is based on strategic considerations in regard to pipeline and portfolio as well as the general strategy for the company. Furthermore, a more informal review is taking place by the executive management that holds an even greater say in evaluating the potential projects and its risk than the formal reviewing board. This role is not an official one but a practice, and is perceived by many of the employees as the important factor to understand when trying to ascertain what will let a project pass through a gate, or not. The reviewing performed by executive management can overrule a decision of stopping or letting a project continue through to the next gate. The COO sees it as his task and privilege to partake in this reviewing of new ideas, and explains it in the following:

> *"I believe in informed absolute monarchy, understood in the way that I would be upset if I did*

> *not manage to listen to others, but it is not a club for discussion and it is not a democracy. In the end, I will make a decision and then we need to move forward".*

It is not uncommon that a review of this type occurs, but in this case it is presented as it influences and configures the development in a certain way as it is perceived as an end goal for some developers to try to foresee how to satisfy the executive management in order to proceed onwards. A concept developer describes how the reviewing conducted by executive management affects the development:

> *"It is a wildcard that appears sometimes (the COO) who in one way or another can seem a bit eccentric… we have formalized a complete process of how to, and reviewers who are employed to be smart and look through the pitfalls… and then this fuzzy parameter appears… and what is funny about this is that, he (The COO) is the most analytical and strategic person in the company who normally sits and measures and weighs everything. And then sometimes he throws in these wildcards and puts a little color to it. – That is interesting. And the organization will have to be able to handle it, I think it adds valuable color to it all, but there are very different opinions towards this, everybody knows that, that is the way it is, but it can be somewhat demotivating for some. I think that this is one of the aspects that cause the challenges in this division (CD), people are too focused on communicating with the COO, and what does he think and say, that they forget to focus on the content of the concept that needs to be communicated to the COO. One thing is the concept, another is that the concept needs to pass through the gates, or else it will not work… "*

The manager for BI states that the development model is something that is needed in the development work performed in PI, albeit maybe not as much in BI, where he thinks that they look at it more loosely in order to stage a space for the creative and holistic aspects of drawing up the contour for new conceptual projects. In the same breath, however, he concludes that the development way is a necessary tool for tying the two development divisions together, as the G2 gate does by passing the concept report over to PI. An

initiative to enhance the position of the concept report is to further investigate what is expected to be included in the handover and how well the checklist for the concept can be fulfilled. In this case, the manager of CD was asked to further define how comprehensively a potential risk in a concept should have been tested, and the level of uncertainty that would be allowed in the handover to PI. Again, focus is placed on the gating process and how to pass the gates by focusing on predefined aspects of the concept development. The manager of BI states when asked:

> *"(…) it is too dangerous to make it too formalistic, but on the other hand, we cannot have people running around doing whatever they want and handing over whatever they feel like in the format they desire. It is the balance in between we have to aim for."*

In this regard, the development model, when staged in a development context, becomes a tool for controlling the development work and the employees and not so much on aiding and guiding the explorative development work into producing better concepts. Again, it is not black and white, and this is the perspective from the manager, but it is worth considering when later analysing how front end is enabled and navigated in order to produce new conceptual development concepts.

The manager of CD:

> *"We separate concept development from PI because we want to create a space for creativity and a more playful approach to development, where you have the freedom to do things in a looser manner. Deadlines can in this regard be dangerous because they can kill the creativity, because you can always deliver on time if you fall back to the well-known existing solutions, but then all we are handing over to PI is just a variation of old well known solutions, which is exactly what we would like to avoid. "*

In this statement, the exact balance between the formalized and the loose is addressed, which makes the future analysis interesting, as it then becomes a matter of how the formal development model is perceived amongst the developers assigned to the specific projects. It is then interesting to focus on

how they navigate and thereby enable specific configurations for the development space and opportunities for development.

One developer from CD states:

> *"Well yes, what is the development way! Ha-ha, as you probably already know I am not the biggest fan of boxes and that it has to be in a certain way and you have to use this template. I think it is killing the creativity, so I am certainly not a supporter. I cannot remember when I last looked at it, that I have to admit. I might use some of it, I probably do. I am not saying that you cannot work with it, you have to have some rules, but I think it is developed to those who want to control how we perform (…)."*

The developer in this statement does not regard the development model as something too important, i.e. that he has to orientate himself in the explicit formulation of the model. However, he sees it as a hindrance for performing his work in the best possible way. This is just an example of how the development way is perceived and how it influences the development possibility, and in this regard takes part in configuring the development space and thus the developers to act in a certain way. This is further crystalized in the answer when asked about other alternatives to the development way, as he refers to an older initiative, namely a handbook for project managers that seems to fit better with the desires he has for configuring a space that aids him in the best way in his development activities.

> *"(…) we had a project manager handbook, that explained different stages that a project had to go through and what you needed to do in these stages; I mean it told you that when you were at this stage in a project then you needed to get input to this and this. And that worked fine, as it acted as a reminder of things you should consider, and not a list of answers. It was a list of inspiration or a checklist, because it was also okay to say that we have not done that and that, that is not necessary in this project, but then it would have left you with making an active decision to deselect it and in this regard make informed decisions (…)."*

To stress the point, this case example is not aimed at evaluating whether one initiative is better suited to being staged in a front end development space than others. The interesting aspect lies in studying, how it is perceived and then how it configures the development possibilities. The handbook does not, in theory, provide anything different from what is included in the development model, but it all lies in how it is staged and perceived by the actors.

Another important aspect in the development model is the legitimacy it gives to the development work. Even though it is CD who owns the G2 gate, many development resources are borrowed from PI, as PI, in general, employs domain experts who are to assist in concept development projects with their expert knowledge. This is again where the development model plays a role, as the manager of CD explains: "If we cannot present a G2 project then PI will not allocate resources to the project." In this regard, the development way is a direct way of communicating that a developer is working on a valuable project and can allocate hours for the work performed. This, in turn, leads to another interesting phenomenon that has emerged. The official development way begins with G0: this is a project kick off. However, G-1 has arisen as an informal gate. It only exists in CD and is presumed to handle the very early idea work where ideas are identified and matured into potential G0. The interesting question is, however, what is the need for G-1, and when will a G-2 be proposed in the instance that G-1 cannot cope with all the uncertainty that is embedded in early idea generation. There are several aspects in this, and one CD developer explains it as:

> *"I think that it is important that something is called G0 and G-1, I think it is an awful name… ha-ha… but I think it is important that the ideas are not only treated as skunk works, but that there is a structured collaboration between BD and CD… I mean it needs to me made legal to put hours into the project. In this house it is best to be working on a project. It is evident that people are comfortable and happy when we refer to a project."*

This is again to point out that, even though the development way does not have any explicit rules nor frames a certain way of doing development, it actually does that; configures for a certain way to perform front end. The question being discussed in CD is thus: if extending the development model is the answer to the experienced difficulties of producing sufficient numbers of viable conceptual projects for the pipeline or if this again just pushes the

problem somewhere else, i.e. in front of the front end development. That will, however, be a question for another time; it is the balance between the formalized and the loose, but I do not have enough data on the matter to further elaborate on these mechanisms. However, it is clear that staying within the known terminology it is important for getting the right attention to the work that is being done, and receiving the necessary resources, thus the reference to the development model's gate system.

Another developer in CD explains that the development way has nothing to do with the development, but instead has to do with a company that needs a tool such as a development model for positioning itself and for the easy communication of a well-designed and structured R&D. It is easier to tell the outside world how things are done if you have a detailed development model that, in theory, provides a frame for how things are done. Accordingly, he emphasizes that what really influences his ability to work with the early conceptual work is the access to good workshop laboratories, of which he does not think they have enough. This stance is somewhat challenged by another developer who, similarly, has been in the company for many years. He thinks that the development way, on the contrary, is good for the development, and explains:

> *"(…) it secures that you get all the way around in the concept design, that you get the right activities in the process in the right time. It is obvious more structured than reality, but reality follows the process described there" (…) "I think that such a template is good to have, and how we use it is that we make a plan for what we will include, we do not have to do everything it says, but we have to regard it in some way or another; that depends on the project."*

It is not a matter of agreeing, but rather a result of how the development model is staged differently in different development spaces and configures accordingly in multiple ways.

KEY PERFORMANCE INDICATORS (KPI)

Another element worth drawing attention to is the KPIs that measure performance in the divisions as well as indicating the performance shown by some key employees. The KPIs are seen in relation to understanding the configuring elements that are staged in the development space for front end.

The KPIs have not been an explicit topic when conducting the field research, and it is not an explicit element that is regarded as influencing the development opportunity in the daily staging of development activities. However, the KPIs have been referred to in some of the interviews, often in the argument for why certain decisions were/are made, which is interesting when trying to characterize what configures the development opportunities. I will, in this section, describe two levels of KPIs. Business Innovation (BI) and CD hold important KPIs that, in an explicit way, influence front end development opportunities as they take part in configuring how to evaluate and perceive concepts. CD works with the task of providing five annual concept reports at G2s that are handed over to PI. This number is a result of a strategic decision of how many product launches that are the goal for the company. The manager of CD explains the calculation as:

> *"We have to hand in five G2 passings. Then we need to have ten G1 passings and 20 G0… no… that is a lot."*

This statement aligns the front end of innovation with the exploitative development that takes place in Product Innovation (PI). The front end of innovation is, in other words, a necessary by-product of the strategy for PI, which defines the goals for the overall development. As an alternative, the number of G2 passings could have been calculated more on the basis of what is at stake for front end of innovation, which will be explained in greater detail later.

The configuration of the development space that is induced by the KPI to reach five G2 passings per year is crystalized in managing which ideas are made into projects in CD. This evaluation of the potential is, for obvious reasons, made upfront, and the likelihood of getting the concept to pass over to G2 influences the decisions on whether or not to initiate a project. When applying the notions of radical and incremental innovation, it is safer and easier to work with the incremental innovation in regard to knowing more of the risks upfront, which is an important evaluation criterion at the G2 gate. The KPIs have nothing to do with how the developers or the managers should think regarding the possibilities for front end of innovation. In contrast, they are a means for evaluating the employees and the divisions, thereby ensuring that the performance meets certain goals. However, it is clear in the case that the KPIs and measurement of good performance are influencing the development opportunities, not directly, but in some implicit, hidden, form, they take part in staging and configuring the development opportunities. In

the short term it will always be in the division's best interest to fulfil their predefined annual target goals which predispose management to choose the projects with the greatest potential for passing G2, and feeding into reaching the five gate passings.

The Vice President (VP) of Product Innovation (PI) has criticized CD for not developing and passing enough projects over with a high enough innovation potential over at the G2 gate. There is a perception outside CD that they primarily produce next generation projects or replacement projects with which the VP of PI is not satisfied. From his perspective, it is a matter of knowing that he will have enough development assignments to keep his employees busy. Therefore, he felt that the initiative had to come from him, as he did not think that CD was delivering what was needed in terms of front end concept projects. The next citation will illustrate this well, it is quite long, but I will also use it to characterize the VP's persona. The interview lasted one hour, but I only asked about seven questions. This answer is to the question of whether PI should wait for CD to provide the concept projects that PI needs:

> *"Well yes, definitely, you are right, if you look at it. YES. The short answer to your provocative question, which is not provocative, would be yes! Then what happened, you have to go back to… it is not just me, it should not sound like it is only me, but I do have a share in initiating an alternative. I do this because I do not go to work every day to please my boss, the CEO, or our board. I go to work to do my best for the company, what I feel is best for the company. Not more, nor less. I do not try and please the project managers or others who refer to me, or for that sake refer to others. I do what I feel is best for the company. And that may be pleasing someone, or it may be the opposite. To me, that is uninteresting, - do I prefer that people like me, yes, I probably would, but it is not what drives me, and yes… there is a point in this. I say: why did we end up where we did? - And we ended up here because of the simple thing; if something does not work, if I cannot use it in my universe, then I can sit down and say well, it was your fault. I am doing this, and what happened over there was not my responsibility or my fault… but I do not work that way. I do what I think is best for the company, and if that means short cutting processes*

or the likings, then that is what I will do. That is why it looks the way it does. If no one else is doing something that is important for the company, then I will do something. And if this is, if someone feels like I am stepping on their toes, then that is how it is going to be. It is always the company that is interesting to me and not some individual or group, or boss.

(…)

See that was one thing, the other is that common sense always applies. So, a process can be a process, but we have to do what makes sense, and not because some process dictates us to so. I mean, it does not work that way either if you see a man almost dying and you cannot run to him because of a red light. Then you will do it anyways, why? Because the wrongs are outweighed by the common sense that you can save someone by running that light. It is common sense, and it applies throughout life. It especially applies at work. That is why it looks the way it does. Common sense told me that I had to do something. Yes true, the process would have been sitting around waiting for someone else to pull themselves together and do something, and I mean, the reason for them not to do something could have been many, but the short answer is still: it looks the way it does, because I made a decision that something had to happen. That the organization that by definition had the mandate to do so was not equipped to do. That is why Leap is the way it is."

If you understand this statement in the light of the KPIs for CD, the controversies are clear, as the leap project is extraordinary and the KPIs of CD is defined to facilitate a well-orchestrated and well-run development process ensuring a fixed number of projects. In the case, the five G2 project passings that CD aims at per year say nothing about the content and nature of the concept projects, but it is easy to understand that the risks are better defined, tangible, and known in a next generation or a facelift project versus a project with a more radical idea. Since there is no evaluation on the "goodness" for the concept, or the potential of the project versus the risks, it is only natural that the rational choice will be choosing a project that most likely will pass the

G2 gate. Through doing so, the KPI for passing projects configures the development space in favor of the next generation or facelift project versus the radical innovation idea.

When looking at the development responsibility of CD, they hold the responsibility for front end of innovation, whether that being radical or incremental development. However, the COO knows that the current setup makes it difficult for CD to work with projects of a more radical nature, and explains it as:

> *If radical innovation is to happen, then it probably has to be somewhere else than in Concept Development. I think that is right… it has always been that way, the leaps (radical innovation) that have been made have been facilitated parallel to concept development, because when first you enter a concept design process then the track is set out for you… the contour is sort of defined. Yes, there are many degrees of liberty and there is plenty of innovation, take as an example IRMA that they are working on, that is… or maybe our Anthonious, no take Polly, it is a different concept, but you can see that the contour is defined, and in one way or another it never gets to be radical innovation, so the type of innovation produced here is within the track that is predefined. So yes, the projects that really have been different have been facilitated parallel to the defined tracks. (…).”*

If I include this statement in the understanding of the configuration of the staged development space, then the expectations and the critique from the VP are not rationally reasonable. However, the configuration of the development possibilities are not openly up for debate, which leaves these very individual translations of the development possibilities to be maintained in the official structures for development.

In relation to the KPI of gate passing for CD, it is worth pointing to a perception that many of the interviewed developers have in regard to how Business Development (BD) works. In several instances, I have heard BD being described as having a work practice where focus for their gate, G1, is to “calculate the business case to its death if possible” or “killing the idea if it can be killed”. There are different opinions on this subject, but in broad terms, the essence is supported in many of the statements from the informants. “Killing

the idea if it can be killed" is closely aligned with handling the risks and how the division is evaluated. BD is evaluated based on their predictions in the business case that are accepted or rejected at G1. However, the correctness of the business case is not evaluated until the product launch and the initial market penetration has been made. In this long term evaluation foresight, BD works with a margin that a business case has to have a potential of a factor 10 within a predefined number of years (depending on the product type). This criterion is, however, difficult to comply with, and a business developer explains the standardizations for working with business cases as:

> *… well yes, we do calculate many projects to so that they are no longer feasible. It has to be this factor of 10, and if it does not have a factor of 10 then it will not be approved and progress. And if we… we have never reached our projections… and it is because people have said that we just have to have this factor of 10, so if we throw this in and this in… And that I think that we are suffering a little bit by now because you have to reach that factor. Instead we should maybe take a step back and say… what are the perspectives? E.g. if we have this technology, if we could do this what possibilities do we then have for the future, and then it may be that it is hard to say if we land at 30, 40, 50, 100 units, but then that is just that, and then you have to guess a number and say this is what we believe in."*

When this element is included in the case description, it is because it is perceived by many to be a very conservative approach to the front end of development, where it is better to not explore an idea if uncertain, than to examine the idea for its potential, giving the idea the benefit of the doubt.

The head of BD does not, however, see the "calculate the business case to its death if possible" and "killing the idea if it can be killed" as influencing the development process and opportunities in a negative way. Instead, he sees it as a necessity for upholding a strong product portfolio, and claims that decisions of this character have to take place somewhere in the process, and perceives no hindrance for it to be placed upfront. He sees it as a test of the strength of an idea, and good ideas should be able to withstand the calculations of the business case, otherwise it is not so good an idea, and should be adapted in order to become one. Therefore, to understand the configuration of the development space induced by KPIs depends on whose

KPIs are in focus when making development decisions and thus creating opportunities.

Another important aspect in regard to KPIs is personally defined. Some of the management team for BI have yearly bonuses assigned to certain projects. This implies that certain projects must pass the G2 gate by the respective deadline. How this affects the development opportunities is, of course, different from project to project, but in broad terms the following statements illustrate the point of working with too many different end goal agendas. First is a quotation from the project manager followed by a statement from one of the developers working on the same project:

> *"Take as an example Irma that I am working on, yesterday I told the head of the division that I had to get some more time, and then there naturally is a reaction of why can you not and so forth… and he did not want to move the deadline… do you know that it is one of his KPIs? – then I had to explain that the COO does not want us to present something that is not finished…"*

> *"Bonuses have to be something than can be measured; it has to be quantifiable and… well! I do not work well that way, I am working on the Irma project, and I don't know if you know it, but the head of the section will receive a bonus if we finish the project this year. I also know that no one in PI is ready to except the project… but yeah, I do feel a pressure for finishing the project and saying, well we will have to just write something in order to close this…. because… not that I receive a bonus, but the boss gets a bonus, and then the boss will be happy"*

It is clear that within the project, if focus was merely on the content of the concept, had come to realize that it would be better to apply yet another iteration in order to comply with PI's desire for receiving conceptual projects with the least possible risk. However, in being owned by certain management with personal KPIs for performance, different agendas are suddenly configuring the development space to having a focus on other development goals. Again, the KPIs are perceptions of how development should be staged and configuring the development space in alternative ways. In that way, the KPIs are not only measuring the performance but also influencing the

opportunities for development. The KPI system is not widespread in the organization, and it is only parts of management that have KPIs related to the progression of the projects. KPIs are not something that is openly discussed in the company, and it is therefore difficult to get an overview of what types of KPIs are present.

A CD developer explains the effect the gating system has on the development opportunity as:

> *(…) I think that there is a tendency that there are too many who try to influence the concepts so that they can pass a gate. And I don't think that is fair, because it is like peeing in the pants, I may be good for now; and you delivered and can cross that off your list, but it will hurt later on in the process. And the further you come in the process until you realize that it is not possible, the more expensive it becomes. So that is why I am very much opposed that someone tries to fix it so that it will just barely pass the gate. That I am very much opposed to.*

PORTFOLIO MANAGEMENT

As part of a larger restructuring of R&D, the principles of lean were implemented in the development processes and were facilitated and driven by PI. This, amongst other aspects, was concluded in the *development way*, as many of my informants referred to during interviews. This story of the R&D division being rationalized by the principles of lean is of relevance when understanding the configuration of the development opportunities. A project manager from PI explains it as:

> *"…ten years ago there was focus on the innovation potential… and that… well it did not result in anything, which means that we are far behind now… also by maintaining our baseline. Our baseline is very important, more important than say in the consumer business…let's say telephones, then there is not much maintenance, you will basically have to develop something new all the time. But in our company it is really important, so we refocused to the baseline when… I guess when I began in the company. Then we started to explicitly say that we needed a plan for renewing*

our portfolio, we have too many products that are too outdated. We have spent lots of time renewing the portfolio and have in this process I guess only focused on this."

The initiative and the drive for the process is, as indicated, anchored in PI, but, as the case description has evolved, there seems to be a clear contour for how closely aligned the PI activities are to the BI activities. The manager of CD has, in the Lego workshop (figure 15), built the landscape for development in PI and states in relation to this; that PI has been optimized for handling development of a project in one and a half years, and, if the project cannot be executed within this timeframe, PI does not want it. In this aspect it is regarded as being difficult to propose projects with too much new value as the risks will be higher and the development time equally so.

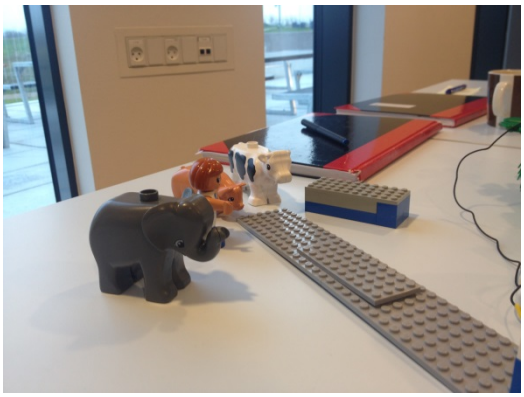

Figure 15: Product development in PI. The development is in the workshop described as the high way for development in PI; well-known and effective.

The main point in the lean process of PI was to put focus on handling risk, or to take out the risks as early as possible. This resulted in the development model – *the development way,* where the gates are focused on evaluating the potential of the idea and project based on the risk factor, both in regard to marked penetration or market share as well as on a technological basis. Furthermore focus was placed on another unit in PI, team technology who work with core technologies. Core technologies are a reference to the technological aspects that should be the backbone in all of the instruments. The understanding is based on the strategy of platform technologies such as that described by Hvam et al. (2006) where you design and build an architecture for the technology which, by adjusting a few components, can bring forth new features. The platform can easily be adjusted to different

needs based on the same technology making the technology well known (less risks) and cheaper in production costs. The configuration of the development space occurs when focus for new ideas and conceptual projects in the front end of innovation becomes restricted or is urged to try and think how core technology can become a part of the final solution, or the developer is encouraged to make adjustments to the specifications in order to comply with the core technology. Implementing technology platforms does not induce a mere focus on the existing technologies, and there is, of course, room for R&D of new technologies. The challenge is then to argue that the new technology has the potential for becoming a core technology. This induces a focus on the construction in order that it complies with the principles for adjustable architectures to conform for any new unknown features and challenges. I do not criticize applying the technology platform, but rather outline the configurations for development that it can have.

Applying the principles of lean on the development process once more directs the attention to the discussion of incremental and radical innovation. We have seen that the VP of PI is frustrated that he does not receive projects with a sufficiently high innovation potential from CD at G2 (his argument is that he needs to know that he will have enough work duties for his employees). Parallel to the story of implementing lean is, however, a strategic focus on streamlining the existing portfolio. This has induced a focus, initiated by management, to perform a series of next generation and facelift projects to support efforts to get the existing product portfolio up to date, which has staged the development space in CD. The updating of the portfolio has been taking place for some years now, and the portfolio is close to being up to date. In other words, this leaning of the processes is moving towards the end, and, at the same time, this has led the focus back towards developing new products to supplement and add to the existing product portfolio. A project manager explains it as:

> *"Well, it will be impossible to lean the company any more, it is in top shape, so there are no other way around it, we have to look at the level of innovation. (…) this is my version… the biggest threat against the company is if we only continue doing that (leaning the existing portfolio). It may work for now, and the next five years, but you have to look at it as a business. I have only been here for three years, but I have been told that you can go back to the year 2000 where the revenue was the same as it is today. We have not grown our top*

line, and if you look at the level of innovation within the last ten years and the focus for this. We have only focused on renewing our existing portfolio, but not by adding new solutions and new parameters. We have only focused on reducing cost, to comply with the lean principles for the production… we have been able to reduce complaints and make it right the first time. So basically cost and process optimizing. When a company spends… I think that we have revenue of 20%, and in light of what we are doing this is great, as this is the numbers they hold in the software market, and not something that you normally have on such one-off instruments that we produce. So I mean this is a fantastically streamlined business. "

The need for looking towards creating more radical ideas for projects is then to be seen in relation to streamlining and updating the portfolio, and not explicitly acknowledging what this would mean for the development possibilities and the lack of focus for producing the next big product success. The frustrations regarding the innovation level of the received concept projects at G2 in PI is somehow a result of their own streamlining and optimization of the development process and has, in this regard, configured how the development space for front end is staged in BI. The explicit configuring elements are the introduction and induced focus on passing gates which inclines towards a focus on minimizing the risks in the projects that are being handed over to the next phase. This could be seen in contrast to having focus on handing over the projects with the greatest potential for creating new markets or bringing in the highest revenue. A CD developer describes the controversies as:

"When the former head of BI was here I think he decided that there had to be six approved concept projects per year, that is now changed, and there has to run five concept projects per year or something like that. But personally I do not think that it should be about a specific number, but the quality of the project. I mean we might run into a project that demands the resources of the entire division, and then it should be okay, there will only be this one project. This could be Leap or something else that has great potential. What is funny though is that we in the Leap project have a

large group of people assigned, but if you look at the individual and how many resources they spend on the project you get a bunch of half employed developers, except for the project manager and the guy in the laboratory. It makes you wonder if this project really should be our new flagship…."

DEVELOPMENT PROCESS

Front End of Innovation is in the company development model defined as taking place within G0-G2 (see figure 13 in previous chapter). In many instances, front end is depicted as a fuzzy something in front of a structured stage gate, such as a development model depicted in figure 16.

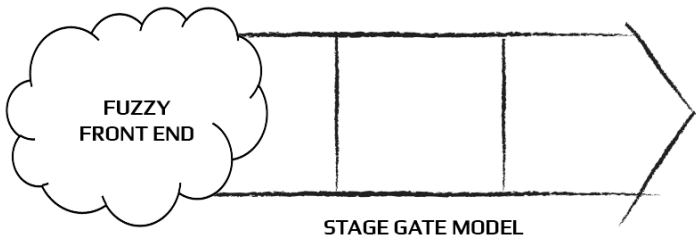

Figure 16: The Fuzzy front end of innovation. Stereotypical illustration of the fuzzy of the fuzzy front end.

The new initiative in CD where they refer to G-1 as the front end where ideas are matured and discovered was interesting in regard to understanding the actors staged in the development space and what configuring a certain element proposed. Again, if I go back to how the development way – the development model is structured and defined, there should officially be plenty of room for working with these more loose ideas and conceptual thoughts that have not yet been crystalized into something concrete and that can be calculated into a business case. However, what often happens when ideas are brought into the development model is that they become more official, and they receive attention from more actors along with a deadline for when the exploration should be performed. The initiative of G-1 is proposed bottom up, and is gated and owned by CD and driven by employees from CD volunteering for the task. G-1 is not official in a company context, and there are no descriptions of *how to* on the intranet or executive management that keeps an eye on the progression. Therefore, my question and curiosity in regard to a phenomenon like this is what drives the need for proposing yet another gate

and, more importantly, what front end of innovation activities are there not room for in the current front end configuration? Furthermore, the last question arises in regard to when a G-2 gate will appear as a result of activities that cannot be framed in the new configurations that G-1 induces into the development space. Applying the same terminology as used in the official development model has, naturally, brought in some of the same rules and configuration aspects. A concept developer elaborates on how she perceives the initiative:

> *"I don't really get it actually, but then you can say…I have to pass this G-1 gate, and to do this I have to have some bigger pop (proof of concept) study, and do you then have to have a smaller pop study to enter the larger pop study… I think it is a little… well you know…(…) it is like if you say you do a pre- pop study or whatever it is called in G-1, then, well let's say they tell you can spend 14 days on it, well then they have already defined the contour for the study and by that limit the exploration. I believe that it would be better to organize such as Leap. Bring a group of people together, or the division of concept design and let them study how to provide something for a specific problem or segment, and then let the idea generation take place here."*

A business developer explains how he sees the development model and bureaucracy as the greatest hindrance to working in an explorative manner in the development space for front end of innovation as it is configured in BI:

> *"We do calculate and process everything to death! There are so many gates... There are too many decisions about making a decision and what decision to make. It is a little too… you know... do we want someone to make a G-1 so that he can make a G0 so we know if we have a G1, and if there is a concept… it is a little… there are too many boxes, it is the process for the sake of the process, that is what it is. And you know what, there are many people who like that, and that is just a matter of what your preferences are, and I just don't. (…) they want everything to be simple and black and white for us to do something"*

Many of the perceived restrictions from the development model are transferred into the creation of new notions, such as aiding the potential project by taking out the risks. However, it is evident that the work done in maturing ideas into conceptual projects is necessary, yet difficult to handle within the official development model due to deadlines and templates that are perceived as being obligatory to follow. One developer in CD explains the phenomenon as making it legitimate to work in this phase of the conceptual project.

> *"I think it is important that there are something called G0 and G-1. I think it is a terrible word actual… well, I think that it is important to say instead of just being treated as skunk work… I mean it encourages collaboration between BD and CD, and it makes it legit to work on it. It has to do with the perception that it is better to work on projects, for as soon we begin to talk about strategy and organization then we lose people. There are not many involved and people are not measured on the basis of it and there are just many people who do not think it is interesting."*

The developer is referring to the recognition that you receive when able to work on projects officially within the company strategy, but it also allows the developer to register time spent on an "official" project. This is important, as each developer in CD has to account for their time spent. There is an understanding that a significant amount of the development tasks that go on in CD need to be outreach work and explorative, but nevertheless it is better to be able to document time spent on projects that are officially in the development system. Therefore, when new initiatives such as G-1 are staged in the front end development space it is configuring the practice of front end of innovation to become more explicit. The interesting aspect is still what configurations were present, or perceived to be present, that induced the change. These new initiatives in my eyes build on some of the same values as the existing one, therefore just repositioning the configuration for the development activities into an adjacent parallel development space. In the case material there are pros and cons against configuring the development space with such initiatives. What is, however, interesting to notice is what the existing development model was configuring for, and instead of prolonging these initiatives into new ones, asks how front end configuration could be staged differently and thus support the front end of innovation practice that

occurs despite the different development models, templates and gating systems.

The thoughts behind the need for implementing G-1 is one aspect, and one disposition, but it disposes of other elements as well, and in relation to the development space that is being configured, it is perceived as disposing of less flexibility and more restrictions to the development possibilities. It is not difficult to understand why front end is being more and more structured. The need and explicit strategy for running a smooth and optimized PI division will induce a corresponding focus for effectuating BI and CD in the same manners (Markham & Lee, 2013). But it is interesting to know how it influences the development space and thus the development opportunites.

THE DEVELOPMENT MINDSET

Management has an explicit focus on the development mindset that should be present in CD. As described earlier, the COO refers to the developers in CD as the problem solvers and the developers in PI as the task solvers. In continuance of this, the CD manager(s) have worked with investigating this mindset further as part of making it a more tangible skill that can be implemented into the daily work practice and approach for development when working with the front end of innovation. One of the initial factors for a change in mindset was the introduction of UX as a discipline and competence in CD. UX is short for user experience and has, in recent years, been in focus in many larger Danish companies. UX, in the case company, had the task of focusing on the users and their interaction with the products. The UX designers were responsible for the development within the use context, i.e. what the customers needed and wanted. The company is relatively technologically conversant and this change in development perspective to also include UX is significant. However, not all in CD acknowledge this new discipline as important, or at least not as important as working with refining the technological possibilities. Understanding the customers has always been part of the development mechanism in the company, but it is how the customers are depicted and used in the development process that has changed with the introduction of UX. Previously, customers have been represented via Business Development, and in the shape of providing facts on how many units they were willing to buy and at what price. Furthermore, customers were represented when prototypes were tested. The UX approach has taken the user understanding to another level and into the front end development where it is a more holistic understanding of the customers and their context that is in

focus. This means that UX designers may not only focus on testing applications or finding out how much they are willing to pay for an instrument, but also discover the customer needs, and the needs behind those needs, in a more qualitative approach. This may pose a challenge on the best approach offered by the technological perspective, but then it is the UX designer's task to articulate the controversy that may be present and enter into a dialog with, for instance, the mechanical engineer, to find another compromise for a potential solution. The UX discipline has grown within the company, and the UX designers have often found themselves as being the facilitator of the conceptual understanding of the proposed concept. They hold the capabilities for broadening the conceptual understanding to entail more than just the technological aspects, but also the concept as a whole.

In the beginning of the field study, I presented material from my master's thesis as an inspiration for staging the mindset for front end of innovation in the division. It did not come as a revelation, but it was exactly what CD was looking for, a framework for explicitly talking about business perspective, technological possibilities, user needs and experiences as the main three areas and also, more importantly, to show how they were equally important.

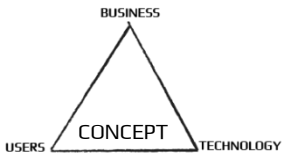

Figure 17: The concept dimensions.

The concept of the triangle provided a framework for understanding the conceptual development approach in CD and was compatible with existing development approaches. CD works with a 360 degrees approach, which refers to the broad focus a concept should include. They define it as:

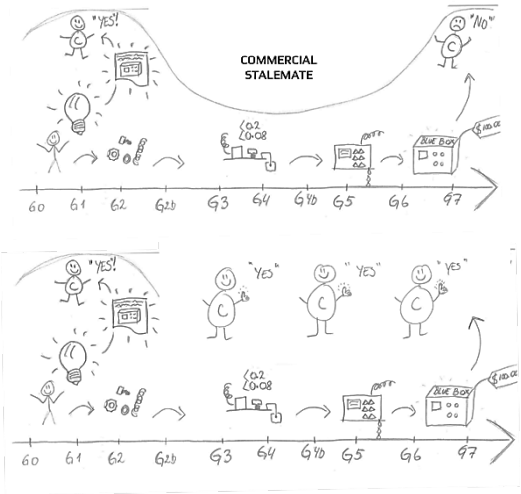

Figure 18: Commercial stalemate. In the upper picture there is indicated that there is a commercial stalemate in the middle of the development process. It is this stalemate that the development way and the induced focus on UX is a result from.

The illustrations above show how a discussion of applied customer focus has resulted in an approach and perspective that ought to frame the development throughout the entire process. An example is that the customers and their needs should not only be present in the beginning and the end towards market launch, but should be kept up to date throughout the process as a means for ensuring a better market fit at times where the concept and project can actually be changed (which is not the case towards the end of market launch). The 360 degree approach is crystalized in the saying that the company does not only develop "the box", but rather a total solution. The box is a reference to the standard and easily recognizable trademark conveying the design of their products. The development mindset should, in other words, be expanded into looking at the development tasks and problems from a holistic point of view and not only focus on what should be inside the box, but also where the box are placed, how it is used, how it is transported, how it is serviced, etc.

The reasoning for focusing on the mindset at the development approach in the first place was a realization from management that the products that were launched had a slow market penetration, and had difficulty in fulfilling the business case expectations, realizing successful innovation and launching new products. However, there is a great step from management realizing that a

change is needed, and for the change to be implemented. Quite a few of the developers situated in CD have been with the company for many years, and have, in these years, gained some experience that influences how they perceive the development opportunities and how they partake in staging the development space. The point in relation to the matter of development mindset, is that it can be difficult to induce the change in development on a practical level. For example, one developer has difficulties in grasping the new discipline UX that has come to increasingly influence the conceptual development.

> *" (…) I think that it (user studies) has taken up too much time. And I also think that UX takes us too much time in the concept development, it is as if it is a bible of things we also have to look at, and it is everybody who has to look at it. We have to make movies and other things such as… well I mean it is okay to make things like that, but if we do not know the technology and know exactly what we have then I am not sure that we can use it… and then I also think that the concept report (handover at the G2 gate) has had a tendency of describing the customers as a person with a name. It may be a good way for some, but I don't think it is in this company. The way we work, and our most important role here in CD is to transform those customers into specifications that can be handed over to the people downstairs (PI) because they do not have any value in knowing Ms. Krause has a sick child and has to get a substitute, I mean what does this entail. It entails that the user interface has to be applicable for many, and that is what we should focus on. (…)."*

This quote represents a smaller group that sometimes finds it difficult to comply with change and the new perspectives of which development is part. This includes the different organizational structures, approaches, models and mindsets that have been tried throughout the years. A project manager from PI explains how this organizational division of explorative and exploitative innovation should be emphasized, and its lack thereof is one of the problems:

> *"In my world then conceptualization should be… you know, if we want business development and concept development separated from the more technical part of the company, then one should*

> *realize that what is needed in conceptualization is generalist and not specialists. If you look at who is currently employed in the concept development group, there are maybe three or so generalists, and the rest is indeed specialists, and they do not think conceptually. I mean do they really think that the conceptual development is the cogwheel and the gear…."*

However, there are several actors around the organization that need a reconfiguration from this more conservative and linear approach to development. A project manager from PI sees a great need and potential in including a more holistic approach as it will open up for new opportunities and give the conceptual work the dimension that formerly has been difficult to handle, and, he explains:

> *"(…) this thing they (CD) do, raising above the details and see things in a greater holistic perspective, they provide the holistic perspective. What they do is, they are able to get all the way around the project in an entirely different manner. And to them it is not substandard to work with… how the containers should be held, I mean, they are good at getting all the way around the solution. The structure that they bring and the concept wheel (360 degrees) indicates all the aspects that need to be fulfilled before having a total solution.*

And a developer explains the new UX discipline as important input in the daily development activities in the following:

> *"(…) what she (CD employee) is 'working with', you know the actual conceptualization, what should it look like, how should it be used and all of those things that are… softer values… and, the thing about researching the market. What is actually the market needs, and what are the different segments… it is very easy to quickly form your own opinion of how thing are in the market which is wrong sometimes… so I think that they (CD) has an equal share in the success of the project so far…."*

In the next section, I will describe the development culture as it is experienced among some of the developers working with front end of innovation in various

kinds. This subject is very much coherent with the development mindset and will therefore reflect some of the same points.

DEVELOPMENT CULTURE

A development culture is not tangible, nor is it static and something that is well defined. I will introduce some of the embedded thoughts in regard to possibilities for development that are staged in the development space. The dictionary.com defines culture as: the behaviours and beliefs characteristic of a particular social, ethnic, or age group, in the instance of the case what makes traditions and habits that create coherence and continuity. What I will try and define here is some of the cultural phenomena that are very dominant in the front end of innovation discipline in CD, which, in unintentional ways, configure the development space or restricts the development space. Therefore, the reference to culture is applied as representing the embedded latent and implicit reasoning for doing things in relation to and within the company. I single out culture as an important element, as it represents something that is very difficult to know about, yet something explicitly referred to. It is difficult to conduct interviews and it is difficult to observe this as a phenomena. Nevertheless, it is important, as it influences front end possibilities and how the front end can be performed. This phenomenon of culture is important as it is not designed and considered in the many proposed models, processes and organizations, but, as shown in the case, it is present and influences the development possibilities as it is staged in the development space and the configuration for a certain type of development. If culture is not something that is made tangible, it is difficult to change. For example, my claim would be that it would be very difficult for a project manager to come in from the street and successfully manage a front end project, as there are many embedded understandings latently hidden in the organizational and company culture.

There is always a balance between being experienced and being conservative in the development approach or at least this is something that I have observed and heard during the field study. I will describe a series of statements that, during the field research, constructed an understanding of what is at stake when speaking of development culture and how it configures the development space. At a workshop conducted in the project that I was following closely, one developer focused only on how much the potential product in hand should cost. This was the most important factor for him to be aware of; as he did not

think that the project with its current path could make a feasible product within the economic frame that he thought would be the most appropriate:

> *"The post-it that I placed on the board where I had written: "how much can it cost?" that was a direct question to marketing. Because if she says that it has to be sold to the customers for let's say 10.000 DKr. then I know straight away that it is not possible, forget about it. That is what my experience tells me anyway, not with the quantity that we make. So it is a very important parameter for me to know."*

These assumptions are made from years of experience, but they also help in configuring the development space that he operates within as he stages restrictions (and possibilities) for the development task defined in the development space. Moreover, he stages experience as a restriction, in this instance as the possibility for influencing the market and the customer into new possible solutions is not a development opportunity from his perspective. It is also an example of the holistic approach toward development that is not present in such a perspective, as the cost is dependent on many factors, one example being on the technology platform line of thought.

Another example is the mentality of "we have tried this before and it did not work" and "there is nothing innovative about it". This condensed view is explicitly reflected by one of the most experienced developers in the company and builds on a long portfolio of previous projects that have not had success on the market, or have not passed the gates. However, what is lacking in this perspective is that each project within a development space is new in the sense that there are different people assigned to the project, in a different time, with different technology. Therefore there will be another configuration of the development space that ultimately will lead to the possibility of alternative outcomes (not necessarily but possible). For what may have seemed as an undesirable product some years back can, in the present time, be feasible and in demand due to other circumstances such as environmental demands, new scientific discoveries, etc. This example becomes evident as the project that I was following in situ was working with a problematization and market where there was no real competition; a new market up for grabs. The desire for measuring the substance in focus was considered to be a great problem and the demand from the market was there and had been for many years. There was relatively ample attention paid to the project as the potential was great. However, CD employees did not regard this project as being something

innovative and new, as the possibilities for working with this market had already been tried in previous concept projects but had failed. Again, what is configuring the development space differently in this instance is the developers assigned the company's incentive for pursuing new markets, and the technology and time, just to name a few examples. The project may very well not succeed, but this should not be because the developers never believed in the potential and therefore mostly worked, unintentionally, towards proving the same principles that had previously failed.

There seems to be a cultural phenomenon that failure is not acceptable. Failure is, in this instance, measured in not passing the gates, as this is one of the success criteria measurable in CD. I have made two observations to support this. The first is a rather interesting statement made in an informal setting from one developer in CD about another. One developer asked me if I knew that another developer had never been on a project that had passed the G2 gate, and thereby continued over to PI to be considered a real project. This, I guess, is unfortunate, if success is measured as handing over concept projects to PI, but if you look at this fact in a more nuanced way, then it would be interesting to know why these projects did not make the reviewing process at the gates (the story did not elaborate further on this). The 'Failure is not an option' approach towards development is not only found in CD, but is something that influences the entire company, and is well aligned with the focus on taking out the risks at the gates as the main factor for evaluating projects. In the lobby, where all visitors have to pass, is an exhibition of some of the products that have had success in the market over the years. This is one of the first things that you see when entering the lobby and the reception area. Down in the basement is, what in daily parlance, is referred to as the *chamber of horrors (rædselskabinettet)*, where all the failed products can be found. These are either products that were close to market launch, but for some reason were not launched, or products that had been launched but had failed. Several times during my time spent with the company, I heard that you do not want to be part of a project that ends up in the chamber of horrors. While this is said in a jocular manner, I sense some truth to the principles of the chamber, as even the name suggests that it is not an exhibition in which you would wish to have your name associated. *Failure* is relevant when looking into which elements are staged for which configurations, and the chamber of horrors being staged in the development space, which configures for a certain mindset and development practice where it is better to follow the safe way, than to challenge the circumstances of the development. It configures the development space to pursue the concepts that are easily part of the strategy to ensure that the project will pass the next gate. In this light, such initiatives

configure the development space, not directly, as it will never explicitly be regarded as being part of the staged development space, but to choose the more conservative and known development path.

A last element, to which I have chosen to refer as the development culture, is the reference to the company values. Historically, the company was driven by technological possibilities and there are some perceptions in regard to what development should be amongst those who were there when the founder of the company was still in charge and had his daily presence in the company. The founder represents a certain era in the development culture, and one developer says when asked about the handling of front end of innovation that:

> *"He always used to come around and just look at what you had going on, and when I explained the project I was working on he would continue and say, no I want to hear about the interesting stuff you have in the drawer."*

This was another type of evaluation of the potential of ideas, one which was conducted more on a personal preference than how ideas and projects are evaluated at the present time. Some developers may, however, miss this more personal approach when constructing and working with new possible innovative ideas. In this regard, they may have difficulties in understanding many of the new initiatives such as the gating system and UX initiatives that encourage a focus on other aspects that the technological possibilities had once set as the foundation for the company. Along these lines, one developer explains when asked about the structure for BI and PI, how he thinks this division of development tasks are affecting the development opportunities.

> *"We have tried this many time before (organizational changes), every two years they try something different, I have learned that it does not matter that much as long as I can still do what I usually do."*

There may not be a practical change in many work tasks for the employees around the company, but on paper and in theory there are great differences between the different organizational changes that have been applied over the years. Both the change and the tendency for not complying with the changes take part in staging the space for development and therefore configure it to act in a certain way. If there is an overload of employees that place focus on keeping business as usual, it may be difficult to work with these conceptual projects that are aiming at new markets or unknown territories. On the other

hand, if there are not any of those employees that, by practical knowledge, have learned the hidden and unspoken configurations of the development space it may be difficult to pass the gates. This is especially true of the G2 gate, which is the prime focus when working with front end of innovation in CD.

The staging of the development space as practiced in CD is not static, nor is the configuration and thereby the development possibilities. It is the situated development possibilities of a given project that is experienced by those who need to navigate the space and produce from within it. It may therefore vary from actor to actor. However the conception of the configuration for front end of innovation in the auspices of BI and especially CD is that there exists rather strong configuring elements that weigh more than others and, for most developers, configure the development space into catering for incremental innovation, i.e. the type of innovation that can pass the gates. To elaborate, the types of developments that is optimized for the explicit processes and as the management have asked for due to the maintenance of the portfolio, is not the kind of development that, in the long term, will create more business and expand the product portfolio. This is the prevalent version of front end seen in the company.

In relation to this overview of different configurations of a development space based on the staging of actors, it is important to put emphasis on how the intention when staging something in the development space predispose a specific meaning and configuration, but also at the same time encourages another disposition that will influence and configure the development space in a completely different way. As seen in this case description, some elements are implicitly staged and dispose of great configurations of the development space and thus the development opportunities. The implicitness of these dispositions makes it difficult to understand the impact it may have on the development possibilities directly and thereby to stage the development space differently based on these realizations. In figure 19, I have illustrated some of the dilemmas that should be present when designing and deciding how to stage a development space, as intentions may also influence other areas unintentionally. There are many more, but these are just some of the dispositions seen in the case company. The figure is meant as a generic conception that needs to be taken into account when staging a development space.

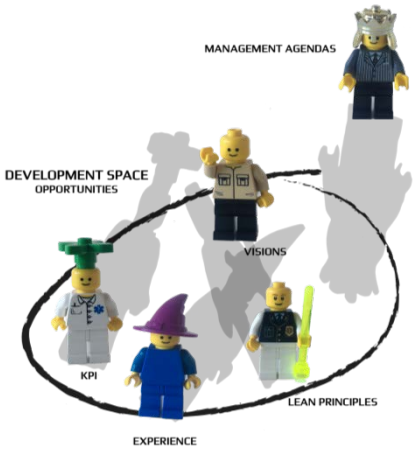

Figure 19: Dispositions in the development space. For all of the elements and actors staged in the development space they can influence intentionally, but also predispose influence in other unintentional ways.

The current understanding of the front end and its possibilities present in CD has induced the staging of other front end development spaces throughout the organization. It is a clear countermove to the configuration experienced in the CD front end development space. The alternative development space for front end of innovation has explicitly introduced configuring elements that are a direct reaction to some of the perceived restrictions for thinking more radical innovation in the development space staged in CD. In the next section, I will describe how this alternative development space is being staged and how it is configured differently, allowing for alternative front end development opportunities.

FRONT END OF INNOVATION IN LEAP

In this section, I will now introduce how an alternative front end has staged a development space, and through this demonstrate how front end is multiple by showing how alternative development opportunities are possible. This alternative front end of innovation initiative is referred to as Leap. Leap was a relatively new initiative at the time of the field study and was not an officially anchored front end of innovation initiative; by this, I mean anchored in BI that officially holds the front end of innovation mandate. Leap as an example of an alternative front end described based on one project. The project was ongoing while I conducted the field study and was my main project in the field

research. I will therefore use this project to illustrate how front end in Leap stages for alternative configurations of the development space thus development opportunities, than those experienced in CD. I will again do this by describing how and what is staged in the development space and, in addition to this, discuss the configurations made to the development space.

It is important when understanding the multiple perspective of front end by investigating an alternative development space to understand the underlying reasons and rationale behind this initiative and how different actors are given agency to act differently. This reasoning is also the source for the ongoing confusion and frustration that has arisen as Leap has grown bigger and received more attention throughout the organization.

DEFINING LEAP

Leap defines itself as working with radical innovation, which is why I refer to it as radical innovation. In figure 20, you can see how this is symbolized by the yin and yang where new technology must remain in balance with new market opportunities.

Figure 20: The development mantra of the Leap project.

This is a result of the desire for not only providing technological innovations to a next generation product, but also placing focus on developing a product with the potential to become a successful and lucrative product for the company over time and does not cannibalize the existing portfolio.

INITIATION OF LEAP

Leap is an initiative anchored in Product Innovation (PI), who are responsible for the exploitive development task in the company. By being anchored in PI I refer to the project as funded through PI by the VP. Furthermore, the main technological idea came from a developer employed in PI who was also

involved in the initiating scoping of a potential project alongside a business developer from BD who in the field had discovered and verified the need for a project with such a focus. The scope of the project is kept confidential, as it does not influence the discussion of how front end is enabled. The project can, in broad terms, then be characterized as working with the radical innovation paradigm, focusing on a market that is known but not penetrated, as they have other applications aimed at the same customer segment. Leap began as something very unofficial, but as it progressed it was transferred over to the more official development system; the development model and the official ownership of BI.

When asked, the Leap project manager says that an initiative such as Leap was inevitable. Therefore, whether it was this initiative or another, an alternative to the front end of innovation development facilitated in CD would have happened somewhere and somehow. He reasons it by:

> *"A quick evaluation shows that the revenue has gone up, but the total number of sales of new products has not, indicating that it is the revenue per sold unit that has gone up due to a lean process of the production and the development focusing on effectuating the development process toward market launch as well as working with the handling of potential risks within a project before it becomes too costly. This states that we need to think in new markets and new products if we still wish to increase our revenue."*

This links to one of the arguments that the VP of Product Innovation proposes when he is asked why an initiative for front end is anchored in his division. In relation to front end, it is important to remember that the role of the VP is a receiver of the concept projects. He receives the concepts from CD at the G2 gate, and then he manages and distributes the development tasks to his employees. Ultimately, PI is measured and the performance evaluated on the outcome; the product launches per year that at the given time of the field study should be two per annum. Another aspect that I have briefly touched upon earlier is that the VP was concerned with the concepts that he was receiving as he did not think the innovation level was sufficiently high, which meant that he was concerned that he did not have enough development tasks to employ all of his developers over time if this continued. The VP further argues his decision for initiating an alternative to the front end staged in BI in the following. The interview revolved around why he did not just request that

BI should rethink their work practice and thereby the concepts that were handed over to PI.

> *"(…)if something does not work, then in my universe it is not an option just to sit down and say well it was your responsibility and then I can sit back and relax and mind my own business, - I do not work that way. I do what I find best for the company, and if someone experiences this as me being in their business then… I guess it has to be like that. To me it will always be the company that is interesting and not the individual or another section or some other manager, obviously you have to think about how you do things, but fundamentally I did something because something else was not working"*

Further along in the interview, he explains the reasoning for why Leap is not handed over to BI. In this specific case, he does not see the competencies being there in regard to the technological level of the project. He explains that the projects, in theory, are handed over to BI, and that it is the manager of BI who officially owns the project. In the same sentence, however, he states that he knows that it does not seem that way. It is also difficult to simply change the ownership of such a project and he describes some of the internal forces for why this has not happened with reference to a football match: (In recollecting that the VP is quite illustrative in his description I have again allowed for a rather long quotation)

> *(…) it is quite simple, if you have a Leap initiative, and the organization that officially holds the mandate to have it has not taken it due to various reasons. Well then you play the ball to someone else. And then they take the ball. And run with it, and then it might be difficult to get the ball back. Exactly like it is in a football match. Yes… you will only receive it when the others feel like passing it to you… or, you can tackle them. Those are the options, and then I will just have to say… concept design, well they have not had the excess energy and urge to… I don't know what the reason is, and I have not thought about it, to take Leap back. And if you do not want to, then you do not get it. That is the way it works, so if you were to ask me if there was a tension between us, well, maybe, I do not*

know. No one has come to me and said anything, I have heard some things of course, but not in detail.(…) and in this regard the things are quite simple, I have been here for seven years, and fundamentally if you do not show initiative then you do not get anything, and you will most certainly not get anything from me. If however you do something, then you will get something. And if you just sit down and complain and say this Leap initiative, it should be in concept design. Then I would say, listen up, before you enter the field and call for the ball and want to be part of the game. You may realize that you are a little bit late, but you say hey, I want to be part of the game now. Before you do that, I will never give you the ball back. So yes, the tension is there if we see it as there is concept development on the sideline and asks why they are not part of the game, and why do I not have the ball. Then I would say, you have to make yourself available and equipped to enter the field and get the ball. And if you still do not make a play at entering the field for some reason; unwillingly or the lack of intelligence or lack of energy…it is much more complex than just wanting it. And now I am speaking in general terms.

But, the organization – by definition has not earned a spot on the field taking Leap back, and if it does not, well then it will not get it. I do not support change for the sake of change and because it in a processual diagram fits better in. If you ask me if Leap should be in BI, well then, yes. I think there are many arguments pointing in that direction, that it would be better there than here in PI…"

This is the case with Leap in its current state, understood in the sense that there is a great deal of timing in an initiative such as Leap. The organization as described has just been leaned and streamlined, resulting in the portfolio being updated and there are no projects left to renew and give facelifts to. This resulted in a pull effect from PI to receive projects that will essentially keep the employees busy, and that will contribute to the revenue. However, seen from another perspective, if the concept projects received in PI from BI

only featured radical innovation projects with high risks, this would also be a problem for PI to handle. One developer employed in CD working in the Leap project explains it as:

> *"This is why he (VP of PI) likes it (Leap) now. If it had been a time where he was completely full with renewal or other type of projects, then it would not have been the same, he would not have had that same enthusiasm. So it definitely has to do with the timing also…"*

This quote also gives attention to the total timing in planning the pipeline and thereby how to place and weigh focus on the different types of projects that ought to be facilitated throughout the organization.

The Leap manager describes the company culture and core values as also influencing the possibilities for making radical innovation happen within BI, as it is assigned to:

> *"(…) one of the great challenges as I see it at the company is that it is a company with some very strong a clear core values and some really strong core technologies to go with it, and we are really competent and good within these core technologies. But it is also a company where a lot of people have been for many years and have built up that exact competence. And it is now the exact same people that we ask to go out and reinvent everything. And at the same time we then sit down and wonder why people who have that strong development paradigms that they have built up over the years will not just take that and throw it away and make something completely new."*

The COO describes the need and the reasoning for Leap to have arisen as natural, due to the way in which the organization has organized for its innovation activities. However, this does not change the fact that it is officially perceived throughout the organization that it is a CD responsibility to produce front end of innovation, including the radical innovation projects.

> *"Well, if we have to make radical innovation, it will have to somehow be parallel to concept design (CD) (…) the leaps that have been developed so far have been facilitated outside CD, because when*

you first enter a concept design process then the contour is drawn up. (…) in one way or another it will not become radical innovation because of the predefined contour for the project that exists in that track. Those projects that have produced something completely different have been facilitated parallel to our process."

Historically, radical innovation in whatever form and shape it must have come, has somehow been facilitated outside the organized development system. It has been in the shape of organizational independent laboratories that had focus on R&D of technology that could then be implemented in the ongoing projects, or it has been in the shape of a *greenhouse*, where specially selected employees were to come up with new innovative and radical ideas. Both of these initiatives have been closed down as they have proved too difficult to align with the other development activities that were facilitated within the development system, therefore not leaving the desired impact on the development. With this in mind, the case description revolves around how Leap is staged with reference to the staging of a development space that is configured into developing concepts that can be transferred into the established development system in some way or another.

THE FORMALIZATION OF LEAP

The anchoring and ownership of Leap is a difficult matter to discuss, and is somewhat political, as Leap does not follow the organizational definition of development activities. I will describe some of the facts and opinions of why Leap is anchored where it is, and give indications of some of the problematics that this induces when establishing ownership of the project for the middle management caught in between.

The focus in Leap is initiated by a BD developer, who had confirmed a potentially significant gap in a market. Timing-wise an idea for complying with this demand had been submitted to the company idea bank by a developer from PI. This idea was picked up by the business developer, who had identified the market opportunity, and a project manager, who would later be the Leap manager. The idea for the project was explored under the mandate and finance of PI, primarily due to personal relations, as the Leap manager was employed by PI and again some political aspects which will be elaborated upon later. As the initial project began to take form, a formal introduction into the development model was made, the first gate G1 was passed, and a business

case was approved for continuation. This passing was achieved with the goodwill of the executive management, who strategically need a project with this type of potential in the pipeline despite it potentially not living up to the standards of the development model and its gates.

Leap was now in the official phase of concept development owned by CD. The project then officially moved the ownership of the project to the CD management, and the official owner of the project was the manager of BI. However, the Leap manager still wanted to have direct access to the VP of PI and the executive management that he had prior to passing G1 and becoming an official concept project. This meant that the official ownership and management of the Leap project was anchored in BI management, but the practical management and the decision makers were the VP of PI and the executive management. A developer from the Leap project explains it as:

> *"(…) all I can say is that my boss has participated in exactly one meeting… I mean not my boss, but my boss' boss. My boss has participated, but he does not do anything, which is fine because he is just not innovative at all. But my boss' boss has participated in a steering group meeting, and a meeting with executive management, and that is all he has had to do with it, it does not exactly show great enthusiasm. Now I do not think that I have said too much, but it is not because the energy is just exploding right… or like, this is so exciting (…)."*

Moreover, the manager of CD recognizes that he does not partake in the project as a real resource, which is probably because of a lack of ownership and knowledge in regard to the project matter:

> *"I do not feel like the project is my responsibility. And my boss tells me that it is my responsibility, as I have to approve the projects approaching G2, then I say, well, but I only get information if I go sit on their lab and ask specifically. I know that is because the project manager of Leap is employed in PI, and he just runs with it… you know, I am fine with that, and I look at it as a reflection of how things are run today. It revolves around the projects, those are the strong ones. We do not have a model for, well, I mean it is not a process that*

> *dictates how to proceed with the development. All projects are different."*

The project is, besides the alternative structure in management, similar to a normal concept development project run in CD. However, in this case there are more people assigned to the project as an absolute number and also there are more developers from PI who have an official role in it. There is a need for the resources that are provided by the CD employees who contribute with a holistic perspective and understanding of a concept.

The Leap manager puts emphasis on the need for competencies that are in addition to the technological, which is the most dominant in the PI development approach. The holistic perspective that some of the CD developers deploy in the project in this phase complements the technological focus and market clarifications that have been the main concern so far.

THE MANAGEMENT STRUCTURE OF LEAP

For driving an initiative such as Leap through the strategic thought behind it, it needs to be explicit. It was thus necessary for the company for portfolio management to focus on new additions, otherwise the portfolio would only consist of products cannibalizing each other and thereby not adding to the total revenue. In Leap this was initiated by a key actor - the VP of PI - who had explicated the need for new products for new markets as a necessary focus point post streamlining the portfolio, a process owned and initiated by him when he first joined the company some seven years ago.

A manager in PI explained that having the executive management backing is the most important thing as it will always be them who will allocate the necessary resources, which again indicates that the management structure in Leap, with the Leap manager having to report directly to the VP of PI and the COO, is a wise move in regard to staging the necessary mandate for working with the scope of Leap:

> *"Well the decision always end up being made by our top management, because if they do not grant the resources for the project then it is not going to happen, we can believe in the project, but at the end of the day, if there is no buy in from their side, it is not happening. I do not think that there in this company is room for the anarchy culture, where someone sits alone working on something in a*

> *corner that no one else believes in… that is not the way we do radical innovation by…."*

This supports the prior experience that radical innovation projects cannot be too decoupled from the main organization, as it is not sustainable. However, it also explains why it may make sense to place Leap outside the normal management structure for front end, as it would otherwise be managed through the configurations of CD.

The Leap manager explains why the management structure is essential for the type of innovation he is trying to stage.

> *Leap would not have succeeded if I had not been able to go directly to the VP (of PI) who sits on the big box of money and has the mandate to make decisions. Had I had to go through some senior manager who would have had some KPIs that did not revolve around this project… and I had been one of many, and might have been the project with the lowest priority then the idea had never been sold to the VP, and I would not have gotten the funding and the possibilities I have. It would simply not have worked being placed elsewhere in the organization, there was a brief chatter of placing Leap in the core technology division, but I put my foot down and said that if that were to happen, then I would not be here. I would not have been able to go through this manager and believe that he would engage in the battles that it takes to get here. I would have been frustrated just sitting around, and it would have resulted in nothing. – So the direct access to the person who allocates resources and the people who eventually will have to get on board has been crucial for the progression and the success. I think that is a really important aspect.*

One argument in this statement is closely related to the KPIs that took part in configuring the development space in CD. The Leap manager is clearly referring to the danger of having too many individuals' personal success dependent on the success of the proposed concept. There is also another aspect of having a direct communication line with the VP of PI as it is he who is ultimately the receiver of the projects after passing the G2 gate. The passing of the gate is a negotiation of whether the receiver will accept the level of

uncertainties that are present in the project. With radical innovation there is bound to be a higher level of uncertainties and risks. The direct communication line with the executive management is also worth enhancing as the reviewing at the gates is performed by the official review board but also, as described earlier, by the executive management that has the mandate to close or allow projects to pass the gate despite their compliance with the gate checklists. The direct communication line ensures an opportunity to continuously keep executive management up to date with the development, along with the reflections and discoveries made during the process, as they will influence the complete picture when evaluating the potential of an idea. This is an important aspect, as the Leap project often will carry more risks or greater risks than seen in the most concept projects facilitated in CD. Ideas configured by the development space of CD are also pitched to the executive management along the process, and the review board is kept in the loop in various meetings. However, it is not the drivers of the idea that are pitching the updates and part results, it is the middle management, the management that in many cases have KPIs that predisposes focus on different matters in regard to defining successful innovative concepts (in the mind of the VP).

In this story, it is important to also include the perspective on the management matter from BI. As stated, the matter of the management of Leap is rather political, and the manager of CD is not reluctant to say that it is a mystery to him that Leap is not anchored in CD, as it should be if you look at the official definitions. The CD manager is well aware that the task for producing the radical innovation concepts is also assigned to his division and that there is both an executive mandate and freedom to initiate such initiatives.

Later on, however, he states that it is not difficult to conduct radical innovation such as in Leap if you just have the budget for it, such as provided by PI, and perceived as not being present in CD. Of interest in this story is, however, that CD, two years in a row have, at the end of the year, had a rather large sum of money left on their budget that had not been applied to any of the current concept projects driven in CD. This has resulted in a request from BI management that if any of the developers could already foresee that they would need something in the year to come, they should buy it already, as the money for the budget would not be transferred to next year's budget. The point is only that money does not seem to have been one of the configuring elements for why Leap has not been initiated in CD. The storyline is, of course, not that black and white, and if we once again bring in the argument that BI has been kept busy by updating the portfolio as initiated by PI, it sheds further

light on the situation. However, it is evident that a conflict exists as to why an initiative such as Leap is possible to stage somewhere in the organization and not elsewhere and what would be the basis for this.

INNOVATION INTENTS

Innovation intents are a new element in the front end of innovation strategy, and describe which new areas development should target. The innovation intents are an initiative from some of the key employees working on the Leap project, and they have phrased them in such a way that it would help them argue the potential of a project like the one in focus in Leap. The innovation intents are not confined to Leap projects; they are official and accessible for the entire organization, including BI and CD. Ten intents were developed, all were accepted by executive management, and represent ten areas of business or technological potential for the company. The business developer who took part in formulating the intents and the concept of the intents explains the reasoning behind them as a change in approach for identifying new possibilities for development areas:

> *"What we do in this project is that we have a more… proactive and more strategic approach. We have identified some areas, because there are many areas that are well suited for our company and line of business. We know that people have asked for us to help them throughout the years, and now we have written them down in these innovation intents, and this is what we are working towards now. They are not static, and should be changed along the way, and it may be that we try something, and then say no, the technology just isn't right just yet. But we have ten intents, and this is where the focus for the Leap project is. They are strategically aligned with our current business, and we know that it is something that the customers are asking for. They have for some time now, so we know that is not just a one-day wonder, but it has potential and there are no existing solution present today.(…) what we have done is that we start by saying, let's begin here, and research the area both from the commercial side and the technological side. We understand the customers need more in detail, and from there we what we can do with these need on technological front."*

However, the acquisition of the intents seems only to be from Leap, as they intentionally staged the intents in the development space. The manager of CD knows of them, but does not know about them, and has not applied them. However, in the next quotation, he does ask for strategic support in relation to where to look for new concepts, which is the intention for the innovation intents:

> *I think that CD has some heavy burdens to carry because someone wants something way up there… and… To get up there, then things have to match right. And if the base is a little shaky and uncertain or if our strategy is a little outdated then it is very difficult to make those leaps, or hops. Maybe Leap is different, but it is difficult to make something that is really ambitious.*

The developers in Leap have another ownership and approach to the intents than most other employees in the organization, as they have developed the content and rationale behind them. They have actively staged them as part of their development space. In this respect, one could, however, criticize the organization and management for not communicating the intents better in a broader perspective for more developers around the company to grasp the possibilities for staging the intents in other development spaces, thus expanding the development possibilities. However, it may be that the agency for performing front end in a radical manner is constructed alongside the ability to stage the intents in a development space.

The innovation intents have become important elements in the staging of Leap as it configures the development space to support the type of development focus that is different from that experienced in CD. If the innovation intents were not an official reference in the company it would probably be easy to shoot down the conceptual idea of the Leap project, as it would not be aligned with any strategic perspective, and it could be difficult to pass a gate. In this sense, the innovation intents give legitimacy to the projects that officially make them equally important to other concept projects as they are directly linked to the business strategy. Furthermore, the Leap project has applied an element from the strategy that it did not see there was an explicit plan for pursuing. In the strategy, it is stated that there should be a quantum leap every other year, and the main driver for leap has chosen to refer to this as their goal for the facilitation of Leap projects within the possibilities stated by the innovation intents. The success is not to succeed (market launch) with two projects, rather it is to identify and try two radical ideas. A first task was

thus to understand what this quantum leap should be. It was defined in the strategy, but not what the content of such a project would be, only that it had to be there. One of the key actors in the Leap constellation says:

> *"We sat down and said, well… Is it something where we have to have certain revenue? – well, yes. There is someone who has an expectation that it will generate some money somewhere or another. And it has to be technological innovative. But to this we made a small twist that would allow us to e.g. develop some software that would just put the technology in a completely different perspective. As a basis we would focus on the innovation level of the technology as well. And on the business side of things we said that we had to change the way, the customers' way, change the way a customer did something. It had to be innovative enough that the customer would do something else than what they are doing today. That may be that he would measure other parameters than what he does today, or it could be that he would use the results in a different way. We had to have changed something, or else we did not think that it was innovative."*

TECHNOLOGY PLATFORM

Another important aspect in staging the development space is to configure projects like Leap to also be aligned with the strategic headlines in the organization. Therefore, Leap has, parallel to identifying and proposing the innovation intents, also made sure to argue the potential of the idea within the technology platform philosophies. This goes well in an organization that has put emphasis on streamlining the portfolio and the development process. A concept developer working on the Leap project elaborates on the strategic moves performed by the project:

> *"(…) but actually, what is so different with Leap is, and that is what he (the Leap manager) has thought of so well that is that it is not just a toxin (edt) project, it is a sensor (edt.) And now they won't make soil analysis, but now they refer to it as mineral detection (edt.) but then it showed that it was another business area that should be in focus,*

which is why it is now referred to as a technology that feeds into the core technology. So even though it does not fit into a fixed understanding, then we have accomplished something, we have raised the level. It may be put aside for some years, but then we can use it for something else then. Then we do not have to start over again, and that is one of the main differences of what he (the Leap manager) has begun and the rest of the projects... it is inspiring and super-smart to have, and that is what I am most impressed about, that he has seen that so early on even though he does not have any training in this."

Team Technology is a division part of PI. They have a stake in all the phases throughout the development model and have responsibility for the four core modules (platform technologies) by developing it further on in the specific projects. The development of new core technologies and to look further ahead and identify interesting trends that may be implemented, refined and adjusted to fit into a core module is in focus for their R&D. Leap is not defined in relation to any of the four core modules, but has the mandate to work outside the scope of the technology platforms. However, what has been a strategically strong move from the Leap project is to align itself with the work being performed in team technology and in proposing the new technology as a potential core technology. There has also been some discussion as to whether or not the Leap project should try and implement the technology principles of another ongoing project that is slightly further on in the development process. It has not been taken into explicit consideration in the Leap project, which might also explain the need for arguing the potential for a new platform technology. On that note, however, there seems to be some ambiguous comprehensions regarding from where the idea for the technology applied in the Leap project has stemmed, whether it is a spin off from an existing technology or who came up with the idea. While the field study data did not allow me to make a close study of this matter, the interesting outcome is, however, that there is an explicit focus in the Leap project to argue the technology possibilities in regard to the platform technology philosophies which are therefore explicitly staged as part of the development space within which Leap is working.

Another developer working on the Leap project explains that one of the reasons why this project seems to succeed in working with this topic is because Leap has picked up a technology that has been explored in another earlier

(failed) project. However, in the process it opened up for the possibilities of pursuing this technology in some other, way which the Leap project has now done. Furthermore, it is the technique that, as a principle, has been transformed into the argument of building up a platform that has made the project even more interesting from an organizational understanding.

A CHANGE IN MINDSET

It is important to note that a mindset is not something that you can just pick and choose, it is, of course, influenced by many aspects, and I will claim that it has much to do with the individual; however, it is also influenced by the experience. It is, therefore, precisely this that can be explicitly challenged if the individual is aware that the mindset, and thereby the approach, is made up of perceived expectations and experiences made in a different context and time. It can very well have changed many times, and will continue to do so, but the explicit awareness is still important. In Leap, there are many different mindsets in regard to perceiving the development opportunities present. It has been a very explicit decision from the project manager that there was a need for a different mindset, as he observes:

> *"You have to find… that common mission where you come together as a team, and you take responsibility for each other. I think that is a big challenge, because people are not used to working like this. They are used to working with a leader who distributes tasks, writes tasks for then to follow up on them. Then it is easy to pack your personal responsibility in the wardrobe when checking in in the mornings. That mindset will not fly in this project, if so nothing will happen.(…) Then there is a great tendency, you must have seen that also, that there is a strong culture of… arguing against an idea by saying we cannot keep it clean! Then I say well how do you know… and then they say well all of my year long experience tells me that it is not possible. I just feel like saying, well time will tell, and then we have to work in order to make it work. What I am getting at is that we have to work in order to get there and making it work. We should not aim at making it fail. It may fail, but then we will know that we did all we could to make it work.*

I just think that some people have a difficult time adjusting to this mindset."

(…)

I cannot drive this process by making action list and following up on tasks; it is not going to work. You need to have people who will show up in the morning and say this has to goddam work. And to gather a group of people willing to work like that in this company is a challenge. It entails that you can handle working with great uncertainties that is not a natural thing to be able to, so you have to let people hang a dry, and you have to not dictate a direction. You have to believe that they can cope with there not being dictated tasks, and then they will pick it up themselves."

It does, however, not only revolve around staging a more open- minded approach towards development, but also to challenge some of the very implicit configuring perceptions in regard to what makes good development embedded in the rest of the organization. For example, the paradigm of failure is challenged, and Leap works with a mantra stating that failure can also be a success if you learn from it. The Leap manager explains how a practice in the company usually handles failing and that Leap have intentionally tried to work progressively with the findings and failings that are discovered over the course of the development process.

"What I think has worked well for Leap is that we, from the beginning, have stated that we were not driven by the market, and we are not driven by technology. We are a merger, so well then we are actually both. Well…. and then we have not done what the company usually does. Well… (Draws on the wall, see figure 21) (…) So if you begin something new, let's say start a new radical innovation project where we look at this new technology for a new market (points to a), then we begin to investigate in all different directions on how to solve that problem. In the process we build up great competencies and while approaching the target then suddenly the project gets shut down… maybe the business case was not good enough. The technology is too expensive. Whatever. There can be a thousand things. Then we do this (b). BANG,

and then we reset it all. Then we begin again (c) saying, we have to come up with something new, let's make something new and radical, let's make a scanner. Then we explore our options. But it is completely orthogonal on what has just been researched and explored. Then we begin building up new competencies, and then the confusion and boom (d).Then we will never build up competencies that are anchored in the organization. This was our baseline for saying that we had to do something else. We do not have to work within these specific definitions of a market or a specific technology, we can handle that we may not know where exactly we are going with this, or it may change along the way, and that is okay."

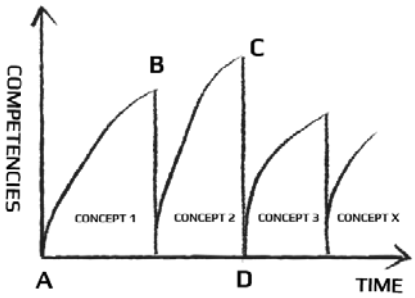

Figure 21: Prevalent approach to building competencies.

It may seem obvious that such a focus would be induced in order to pick up learnings in the organization, but it does not seem as if it has been part of the development practice so far. This is again with reference to the chamber of horrors that displays all the failed products produced in the company, and that there exists an awareness of this in regard to passing gates. It is as if the chamber of horrors reinforces that an idea is bad if it has been tried - and failed - then that is the end of the story. The Leap manager explains the approach and mindset that he is trying to stage and enforce in Leap to be more concerned with always finding new areas where the new insight can still be applicable if it is not suited for the area first in mind. (Figure 22)The market upon which Leap is focused is also one that has been in focus before, but where the technological possibilities have failed, which in this case, has been staged in the development space by the experienced developers that

bring in the stories of how the previous projects have worked with the same problematics and business area, but failed.

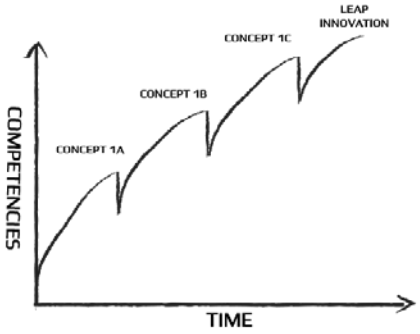

Figure 22: Alternative approach to containing learning in the organisation.

A developer explains one of the reasons why he thinks that this Leap project has succeeded so far, and gives credit to the approach of the management for continually pushing the boundaries. Even though it may have initially seemed completely unobtainable, they now have a project concept that is close to fulfilling some of the very demanding requirements proposed by the market that has previously shut down other projects. This drive to *keep pushing* for alternative development opportunities and expanding the solution space is a result of a different mindset staged in the development space where the impossible is not impossible before it has been proven impossible. This has induced a drive amongst the developers and has, in this project, paid off, as they have pushed the barriers for what is possible within this technology and the market.

> *"Well, what drives it is that the big carrot hanging out there right, there is a giant market if we can get through this. And then it has ensured that we have a tireless developer continuing to say, well it could be nice it this could work, and then maybe we could also have this… and then she proposes demands that make you think that she is crazy. But then you begin to unfold it a bit, and well yes, you can try and do something here or here, and cut some, and now that we have cut some more then we actually may be able to hit those five minutes. Well almost around that. Previously we would have said well under 20 minutes is just crazy…so just stop! (…)"*

The mindset(s) staged in Leap are very different in nature and have been a great challenge for the Leap manager to handle, especially the mindset that is staged by some of the older and company-experienced developers. Moreover, the developers from PI work on the basis of a different structure and criteria for success and progression that are highly linked to focusing on eliminating risks and the potential for the project to fail. One of the other drivers in Leap explains the mindset as being a direct obstacle for staging the type of development space found in Leap and, during this project, it has become more evident that in the future there will be an upfront focus on articulating what is demanded of developers who are working on this type of project. It is important to state that it is something different, and it is a development space with other configurations that will allow for other types of ideas to emerge and to evolve:

> *"We have some that are a little like… well; it is just uphill from there. But I know that the Leap manager has spoken with them and explicitly said that it is not going to work and that we do not want to hear the negatives all the time. If you wish to continue this project then you need to change your mindset. We have to address it because it is killing our process when there is just one person that continues to doubt every idea and in general is just negative towards the potential. We have intentionally tried to make the atmosphere a little loose so that it was okay to propose crazy ideas. It is also allowed to laugh a little or tell a joke. We need the positive, and then we will succeed in coming up with something concrete that people can believe in so it is not just fluffy. So, we have tried to establish a safe atmosphere… we all know that if we just all say that it is high risk, then it is not so dangerous to fail, because we know that it is an option, but we also know that this is where the potential is."*

Addressing mindset as a skill is a new dimension in relation to evaluating different developers' skillsets and determining whether they are capable of working with Leap-like projects in the future. However, in the case of Leap, the explicit focus on mindset and approach to development has proven to be important, not only for understanding what is at stake while the project still has the status of being explorative, but also how it will progress further on in the organization. However, due to time constraints, the official field study did

not expand into this phase of transition into the exploitation mode of development. Nonetheless, a brief follow up has shown that the progression into being a regular project within PI is difficult because the project carries a different margin of potential risks. This is the rationale that Leap argues in relation the potential of the project, but is difficult to handle due to the gate passing focus that exists in PI and the assumption for success. Many of the expert domains embedded and needed in the project in PI have difficulties in working with the problems, as they are radically different from those with which they normally work, and it is easier to then prioritize other projects that are more likely to succeed in regard to reaching the KPIs and passing gates.

Working with explicitly staging a mindset that configures the development spaces and opportunities seems to be important when a project is working with ideas that are challenging some of the established conceptions of what could be considered a good product. Not staging a specific mindset seems to dispose of many different presumptions that may not be configuring the development space to support a radical idea that may need more time, different evaluation criteria, different margins of error, alternative competencies, etc.

INTREPRENEURIAL SKILLS

One developer raises a concern that there seems to be relatively large numbers of developers from CD who have transferred internally in the organization or left the company, which means that the employees left in CD are new to the organization and do not know of the history and culture present there. It is important to note that there are few employees in CD who have many years of experience in the company:

> *"There have been many changes in concept development in a short period of time, people have transferred internally or out of the company, and those left do not have that much experience with the development process. Many of them do not have a feeling of the great machinery that they are feeding into."*

The developer addresses a skill and competency that is not present as an official competency a developer needs to have in order to be considered a good developer. In order to enhance a product idea in the development system you not only need to have a good idea, but also know how to pursue it

within the development model and its hidden agendas. A PI manager also addresses this problem of not knowing the company as a problem when working within the development model:

> *"Jah, there has to someone who is creative and can see how things are put together, but I also think that it is important in an organization such as ours, no probably in general that you have someone that has a good feeling with what the company actually does. It cannot be someone just off the streets; it has to be someone with some years of experience in the company. - Someone who knows something about the technological aspects and also have been involved in doing some business development. Because I think it will be difficult to spot a really good idea otherwise. Because spotting a good idea is not only about spotting an idea that is good for the customers, but also an idea that is good for the company."*

Knowing how to manoeuvre the company rules, practice and structures will in this paragraph be translated into intrepreneurial skills and has proven to be very important in the staging of the development space for Leap, and thereby the alternative configurations for development that this has induced.

The intrepreneurial figure in a company is not to be mistaken for the well-described idea champion such as explored by (Chakrabarti, 1974) or the product champion who Kim & Wilemon (2002)scribes as being the driving force for succeeding with front end ideas. There are similarities, but I will try to unfold what else intrepreneurial figures are capable of achieving. The idea champion is driven by identifying the good ideas and developing these into successful products, and they do this at the mercy of management, who give them a mandate for not complying with the embedded rules of the company. There thus exists a form for autonomy sanctioned by the company. The idea champion is a character who may very well be an entrepreneur in another setting outside an established company. In contrast, the intrepreneurial character is an idea champion who complies with and understands the company rules, practices and structures whilst developing their great ideas. In this light, it is worth putting focus on the terms of staging and configuring the development space to support a different purpose. In this regard, the competencies are not involved with just disregarding the rule or not being compliant with the rest of the organization, but are rather about finding or creating a path for the intrepreneur to be compliant with the rules of the

company. It is an entrepreneur who knows how to navigate, and thereby configure, the development into catering for their own needs but is still perceived as compliant.

There are several developers and managers involved in Leap that have some of these intrepreneurial skills and the decision to propose innovation intents and argue the potential in regards to platform technology are good examples of this precise issue. The Leap driver who has been the driving force for many of these initiatives does not himself, recognize the intrepreneurial skills as skills per se, it is so deeply embedded in just the way he thinks and acts that it is not something that is done intentionally to create this development space that is created. It was actually not until, in an informal meeting, I drew up the contour for this type of thinking that he became aware of the explicit outcome for working on the strategic level as he had done in order to configure the space to make room for his development agenda. The COO recognizes the role of the Leap manager and that there is a need for them in the organization, but also that such a character is raised from the bottom up. He says that there are opportunities for those able to grab it. It is not a matter of being allow to run with a front idea, it is more at matter of being able to.(Baer, 2012)describes that the difficult part is not getting the idea, but to get the political support for it. The creative element is according to Baer more in regards of how you navigate the possibilities than getting the actual idea. The CCO say It has to be a skill that you demonstrate, and if you do that good enough then you will get more space to stage a development initiative within:

> *"I think that you one way or another have to find these ideas and work with them within the organization. Here other things also take place and use this as inspiration. Then we have to create a space where it is safe and legit to work on these ideas. (…) We have always had a space for those people. It is like the Leap manager, he has also been given the mandate to go do something of his choice. If others should get that urge then I think that it is important that we create a space for them to act in. But you have to come forward yourself, I do not think that you can establish an organization for this. When we hear of someone with these skills out there we try and head hunt them by tying them to the company one way or another (…)."*

In Leap it is fairly well known that the role of the Leap manager is a great factor as to why they have come so far with the development of a radical new

idea with a great market potential. One developer describes it as knowing when to be compliant and when not to so that you challenge the embedded rules, practices and structures in just the right way. It also shows that you still dare to demand something back from the organization, define and put up things that the organization should do in order to configure for the desired outcome of the project in focus. If the argumentations are made in the right manner it is highly respected, and the company and organization is most likely to respond in kind. Of course, it is a matter of finding the balance and choosing the right strategy for this interference. The Leap manager reflects on his own process of being compliant with the organization:

> *"Well… I think I do this navigation, it is about being… What is it called...something about not listening in the right way? It is called autonomy that is the word. You have to be autonomous in the right way, and that is what makes it difficult. You cannot tell people that it is okay to be just a little autonomous, because most will be autonomous in the wrong way. You cannot have that in a larger organization. It is about being right in the right way and staying within the frames for development, but not necessarily within the road to it. You have to understand the rules, but also listen and get in line. So you have to understand the game or take part in designing the game, so it does not just about understand the rules…."*

In relation to having the right mindset, there is the official distinction between the desired mindset of BI and PI from executive management. In contrast, there are the development mindset(s) present within the organization that are a result of many aspects, amongst others, experience, and then there are the personalities. Luckily, there are many different types of employee, and a BD developer describes this aspect as being something that should play an active role when staging the development space of a Leap project with developers. She explains it as:

> *"(…) it is important to find the right people who have the energy and think it is fun to work with. It should not just be that person in concept development who knows something about whatever we choose to develop, you have to look around and there might be someone from the Swedish department or someone else that just*

> *thinks I have to be involved in this project. I would much rather have that person assigned to the project than someone from CD who is just assigned because they are from CD. On the technical side it is easy to say who knows something about it, but I would much rather that we say who would like to know more about it; who say this is exiting and are willing to put in the late hours measuring something or sit by the computer late at night researching the nerdy stuff. That is what is important for a project like us"*

In a project such as Leap, there are more obstacles than in the other types of front end projects. Alternatively, there may not be more obstacles, but they have a different character which implies a different approach, and this approach and mindset is what, for many of the involved, seem to have the greatest impact. The expert domain knowledge is important, but it is something that can be brought into the development space if just the right people are staged in the space. This leads me to one of the political conflicts of the existence of Leap. In the field research it became interesting to explore why Leap was not anchored in CD, or, perhaps more interestingly, *could* Leap be anchored in CD. The manager of CD has explained that radical innovation is not difficult to facilitate if you are allocated the money to do so. Leap has a relatively large budget, larger than a normal conceptual project facilitated in CD, but, as I, described earlier, CD has not managed to spend their allocated budget on the projects facilitated here for two years in a row. Therefore, there must, in some form, have been some money that could have been spent on a project like Leap if it had been possible and desired. A CD developer explains why she does not think that Leap could have been initiated and facilitated in CD:

> *"(…) I don't think so, it is very dependent on the person, and it is about being able to drag something through the organization. There are many people who are good at getting ideas, and then they work a little bit with the idea… but the Leap manager he can pull something though all by him-self and that is a quality. He has gotten a lot of money to do it, it is also about the money and getting the time to do it, but is also about the person (…)."*

With a stance such as this quote, it is not all about the money, it is rather about how the money is administered that makes the difference. The intrepreneurial skills are about finding a path or creating a path for pulling one's idea through the organization. (Baer, 2012:1104)describes change agents as having the role of the intrepreneur as they can get ideas implemented in the organisation by proposing agendas and engaging management, The intrepreneurial skills are often not something explicit, but are instead embedded in the personality.

CHANGING THE PERCEPTION OF HOW TO DO DEVELOPMENT

Leap is not an official part of the organization. If one were to draw an organizational diagram, Leap would not be in it, and the people involved would be included in other divisions and initiatives – so far. Constantly having to fight for an existence can be challenging as there is hardly any credit given to the work that is performed, as the official evaluation schemes does not cover the area in which Leap is working. Leap is, therefore, merely an addition to the rest of the organizational activities and focus. It may be a little overstated, but it is a fact that working on Leap does not arouse the same attention as working on another CD project about to pass the G2 gate in the sense that there is recognition involved in this process. There seems to be more of a practice that the Leap developers are told when they do not perform well and when the work they are doing is not sufficient, rather than a focus on the great steps they have already accomplished. What I am getting at is that many of the informants that I have interviewed have indicated that it is a premise when working on the Leap project that you do not get recognition from the rest of the organization. Moreover, if you do get recognition, it is from other project members and potential receivers of the project within PI.

There are no KPIs attached to the performance of the Leap project, but the project still has to comply with the embedded structures revolving around the KPIs such as passing gates. A developer explains how the CEO only recognizes products being officially launched within the next six months when he accounts for the pipeline in official statements or such. This is probably quite natural, but sometimes it is difficult for the Leap project to know that they are doing something for the organization and not only for themselves. It is a premise, but it can still be hard and sometimes difficult. One developer explains the initiative as having an expiration date because of this:

> *"If I have to be completely honest, then I think that we need to get a little recognition. At one*

> *point, the Leap manager and I will burn out and therefore not be willing to go that extra mile. – You know, if the work that we are doing is not recognized. Then there may be someone new to take over, I don't know. But I do think that you will burn out eventually if you are never told that what you are doing is good. And that is not the case; no one ever tells us that what we are fighting for is good. Well, only within our own project group. In the project group we are really good at remembering to say that what we do is good. But it just does not cut it; I mean… it just is not enough. My boss….!"*

Taking a step back, Leap is only allowed on the basis that someone placed high up in the hierarchy thinks it is a good idea. However, in the long run, it may be a good investment for the management if this recognition becomes more evident in the daily practice. There is a balance, and one of the reasons why Leap can do as they do is that they are not subject to the configurations that are found elsewhere.

The staging of Leap is not an example of not being compliant with the so-called organizational rules and development practice, rather, it is about understanding the premises for staging an alternative development space that configures for a different type of development, involving staying within the rules but re-staging the different elements to configure for a different development space. Leap is not only inventing new elements like the innovation intents, but it is also staging the development model differently, making it configure the development space in other directions.

The staged front end in CD is highly configured by the development way, and for some it is experienced as a restriction on the development possibilities:

> *"Well yes, what is Foss way? Ha-ha, as you probably already know I am not the biggest fan of boxes and that it has to be in a certain way and you have to use this template. I think it is killing the creativity, so I am certainly not a supporter. I cannot remember when I last looked at it, that I have to admit. I might use some of it, I probably do. I am not saying that you cannot work with it, you have to have some rules, but I think it is developed to those who want to control how we perform. (…)"*

In Leap the perception may be the same, but it is also staged so it configures for completely different possibilities. The manager explains it as:

> *"It's a necessity as it gives access to resources and visibility to management. To me a process is a communication tool that is what it primarily is. When I say that I have passed G1 then the CEO knows what I'm doing. Then I don't have to say anything else basically, and that is the visibility it provides. So it provides validity to the work we are doing."*

The business developer further explains the strategic move behind choosing to follow the development model and what it provides for the project. The development model is not applied with the same understanding of its possibilities as understood by the developers working with front end in CD. It induces a momentum on something that is very important for a project like Leap - recognition and credibility - as there are factors in the Leap project that entail more risks than most other projects:

> *"We have chosen ourselves to follow that (the development model)… because we think… because getting transferred into PI with the same credibility as any other projects is important, and then we have told our self that we do not have to follow it all the way through (…)."*

It is interesting how this alternative staging and thereby configuration takes place simply by ascribing alternative attributes to given tools that are obligatory to include in some way when working with development in the organization. The configuration possibilities for the development model identified by the Leap manager are an example of a reconfiguration of a staged element.

Another example of how the development is staged differently to configure a different space for the Leap project is quite simple; it has to do with how the development team is organized. The Leap manager introduced a project day where all project members should be present at a morning meeting where status and potential problems or new insight would be discussed. The thought behind this was to create a momentum and the sense of working in a team, which he felt was lacking. There are many core technological domains represented in the project, and the meeting is a space where these experts can think holistically and contribute to the conceptual development process as a

whole. Also important is the experienced effect of being on a project team and the obligations this entails in contrast to being assigned to deliver a specific piece of technology to a project, not knowing how others contribute.

NETWORKING – CREATING ALLIANCES

The segregation between explorative and exploitive development induces a sense of a 'them and us' mentality. The G2 gate is the clear cut-off point, where *my* responsibility ends and *your*s begins. The transition over G2 is historically difficult and there are several issues at stake. Receiving an idea that you have not come up with yourself can be difficult; both in regard to seeing the potential, but also gaining the ownership, and thereby drive, for creating progress is difficult. Once factoring in the zero tolerance for errors it seems that it can be some sort of blame game at times, namely blaming others for not having done their work in a proper manner. CD is focused on the PI's seeming unwillingness to see potentials in ideas, whilst PI seems to blame CD for not doing a good enough job in regard to mitigating potential risks. Furthermore, there is timing in this transition and handover of projects from one division to another. CD employees experience that the projects they hand over to PI are just parked and not brought up until years later. This also influences the potential momentum that the project might have, as the concept developers who have worked on an idea will have moved on to work on the next idea. In relation to some of these concerns, the Leap project has worked with an explicit focus for creating alliances with the people receiving the concept project. This may be easier, as PI is already quite heavily invested in the project, but nevertheless it has been a clear strategy after passing G1 that Leap should focus more on including the rest of the house. From my perspective, in this case there are three explicit reasons for this. One is that Leap carries more risks and more uncertainty than most other concept projects being handed over at G2. These risks and uncertainties need to be sold to the receiver, equally, the receiver needs to see the potential if the hurdles to overcome them are greater than normal. By convincing the potential receiver in PI of the potential of the idea that is embedded in all the uncertainties and risks before the project is their responsibility, then they will more easily take ownership of the idea, not only the potential but also (hopefully) the uncertainties and risks. The business developer explains:

> *"The VP of PI knows and understands what is going on because the Leap manager has always, in contrast to many other projects, included him in the process. Because when we know that this*

> *project might be a project that some could have some concerns about, then we have already tried to say: but dear (VP) who do you think should be the next project manager, and then we get one assigned early on, and then we ask can you not come by our meetings once in a while, so that you now already get an idea of what you are dealing with and can ask us to do something else because you feel uncertain if you should take over this. So we try and migrate the transition already so than we hopefully will not get a big NO, and I do not want to touch that later on in the process."*

Secondly, it is to create this ownership and dedication to the project; something that is needed in order to continue to push a project that does not fit into the perceived embedded rules, structures and practices forward. This is even more relevant with the development configurations of PI that are more focused on effectuating and executing. The transition from explorative to exploitative and the change in employees are by the VP seen as a necessary and fruitful change. He argues that a person often tends to handle their own creation and concept as a baby and thus blind for potential downfalls. However the transition is difficult and a great deal of knowledge is lost in the process. A business developer elaborates on the second reasoning for explicit working with a strategy for including the receivers of PI:

> *"Well, as there in general in the company is a great loss of knowledge in relation to the transition at G2 it is something that I wish to influence if I have the chance. How do we manage to diminish the loss… and then we have been lucky to have developer 1 and developer 2 assigned to the project from the beginning because it just turned out that they were the ones who knew about the subject (they are following the project over the transition)(…) not only because that there may be new people assigned to the project, but because I have seen that a project has been parked for 18 months before it proceeded in PI, and that is… that is then just a real killer for the momentum."*

This included the different actors who should be later involved in the project via personal relationships with the developers in Leap. I attended a meeting where there was a list of people that they would like to include, and then it was divided by the team members on the basis of who knew whom the best, or

would eat lunch with them or something else. The intention was to invite the potential receivers to join the weekly morning meetings in order to keep them updated and to begin the initial sparring with the experts representing different domains. Including the potential receivers early on also means that it will be easier for the project to ask for their help later on with clarifying the different aspects that are needed for passing the G2 gate, something that historically further draws up the boundaries for *them* and *us*, as the PI developers are not officially recognized for working with BI activities and it is therefore additional work to their daily tasks.

> *"(…) it is about getting people on board and getting it sold, but without having to sell it too much and then get the work done little by little. (…) there is nothing worse than if we as a project suddenly realizes that we have to prepare the concept report for passing G2, and then come and say hey we need input in six weeks and we know it's Christmas and… it is much better to have already started the process before summer vacation so that people can plan their time over fall and we can prepare them for the things that they need to deliver in time (…)."*

The project held presentation meetings on the basis of *come if you are interested in hearing what we are working with*, where the project team would introduce the potential of the idea, the status, possibilities and potential risks and uncertainties. These meetings were relatively well visited and, at the one meeting I attended, there seemed to be a good dialog between the potential receivers and the Leap project members where technical aspects were discussed and elaborated upon. Thirdly, a side effect is that such an initiative would change the focus slightly from being a push effect to a pull effect in regard to getting the project through a G2 gate, which addresses some of the historically perceived difficulties in passing the G2 gate.

CHAPTER 5 - UNDERSTANDING

In the case just presented, I have shown how actor collectives are mobilized into performing front end in different ways. In this analysis and discussion of the case I will take a step back and try to understand the conditions regarding why front end is performed as it is in the case company, on the basis of what is difficult when dealing with front end. My claim will be that if I better understand some of these conditions of what makes front end perform as described in the case, then I can begin to understand front end from an alternative perspective. On that note, I can then actively elaborate on the staging of front end, where certain key actors are important in the creation of agency that will take part in enabling the front end. However, first I will put into perspective the conditions for why front end is difficult, and then what is needed in order to stage alternative front end spaces applicable for the desired front end activities and focus.

Benner & Tushman,(2003) Describes that exploration development is difficult to facilitate in larger mature development companies. Several scholars discus the problems of front end as being aligned with the lack of alignment with the exploitation. Khurana & Rosenthal (1997, 1998) describes how the scope of front end is to obtain acceptance of the idea in the exploitation, which is why the processes are (and should be) optimized accordingly. (McDermott & O'Connor, 2002:425) describes why it is difficult to facilitate both the explorative and exploitative development as focus in larger development organisations often are on those projects carrying the lowest risks. As Leifer et al. (2001) argue, having both exploration and exploitation within the same organization is difficult, as they influence each other. Leifer et al. (2001) further claim that this was the result of year-long development of the exploitation approach as well as the evaluation structures of development performance that would affect the explorative innovation opportunities. The question is, therefore, when looking at the case, what is then the takeaway point for what influences the configuration of the front end space (explorative innovation), how does it influence, and how can it be explicitly worked with once recognized?

My case shows that the uncertainties and the ambiguity that is embedded in the early stages of development are difficult to handle in the established structures for handling development. Therefore, it does not make sense to simply develop another tool, process or organizational structure, as it will only displace the challenges for working with front end as long as we do not know

the premises for which front end is performed. At least, I do not know how the nature of the design of such entities would be.

Key actors, such as the Leap manager, need guidelines, terminology and an explicit understanding of their navigational opportunities in relation to staging and thereby configure alternative development spaces for handling front end with specific agendas.

I will draw attention to the difficulties for working with front end and thus enable it. The offset for this discussion is the case just presented and what other scholars have described in relation to informing and understanding why front end is difficult and thus how to enable it. It is the intention throughout this chapter to build up the argumentation for how to then understand what is at stake in front end and what front end as a phenomenon can be characterized.

EQUIVOCALITY AND UNCERTAINTY

The fuzziness of front end is often perceived as influencing negative, and it is treated as though it should be reduced in order to succeed in front end development (Khurana & Rosenthal, 1997, 1998) However (Chang, Chen, & Wey, 2007) states that it is important to understand to fuzziness so that it can be embraced and utilized in the front end development. (Brun & Saetre, 2008) present a rather interesting study of four cases where the focus has been on understanding the fuzziness in the front end (thereof the name fuzzy front end as referred to by some). They investigate the fuzziness by means of ambiguity as they claim it is an essential part of the *fuzzy* in the front end. It is thus necessary to understand ambiguity in front end before you can reduce it, and better the conditions for new product development (exploitative development). Brun and Sætre present some interesting aspects in relation to embracing and acknowledging the ambiguity embraced in the fuzziness in the front end, and that it is important that we further understand this ambiguity in order to understand how to stage a development space for front end. However, the story of the case study primarily focuses on the developed model that helps front end projects *reduce* the ambiguity in a project. This perspective fits into the perception that front end is, and should, be in front of something else, and thus aligned and adjusted in accordance to the exploitative development. The storyline of the paper is interesting as it frames one of the aspects that I have identified in the case as being a source of both problems and different goals for success. Brun and Sætre (2008:574) state:

"(…) front end is the starting point that determines the direction of the NPD process (new product development, understood as exploitative development)" Here, they draw up the contour of the source of why front end is experienced as difficult in the case. By describing a focus for front end as something that is aligned to the exploitative development, the well-established structures of the exploitative development will affect the possibilities for working with explorative development. However, since it is two different development disciplines and it is asked for by management, my case shows that we need to think about the two development disciplines in different manners, if the agenda of the exploitative development should not outshine that of the front end, as it easily does as it is better defined.

The focus is, as Brun and Sætre (2008) describe, often on effectuating the processes for the exploitative development, hence the terminology. However, effective is not the focus point for front end initiatives such as the Leap project, nor the conceptual development that ought to occur in CD. I am aware that the premises for studying front end in Brun and Sætre (2008), represent an alternative take on how front end is studied, as they have studied front end in regard to adjusting it to NPD, and I have studied how front end is performed and thereby enabled or its lack thereof. Nevertheless, Brun and Sætre (2008) acknowledge that front end is difficult, and changes are needed. I will therefore once again challenge the strategy of aligning the two different development types as a means for overcoming the challenges. In my case, it is evident that Leap lacks something that is not present in the mainstream organization, but because it still has to comply with many of the perceptions of development stemming from other parts of the organization, there are two ways the development can go. Of these, one is slowly losing the desired edge of being of the more radical nature and focus on incremental development projects that fit into the maintaining of the product portfolio. In contrast, the second is that development activities become too detached from the organization as a result of not having to include mainstream perceptions of development. This would make front end difficult to communicate, acquire resources and eventually hand over to the exploitation development.

A further very interesting aspect of Brun and Sætre (2008) is their discussion and understanding of the term fuzziness to be broken into uncertainty and equivocality. Uncertainty is described as the absence of information, thereby allowing the degree of uncertainty to decrease as the level of information goes up. This plays well with the philosophy of concept development in BI in the case; the development is facilitated through the development model up until

the G2 gate, where it is officially handed over to the exploitive development division.

Another perspective on fuzziness is that of equivocality, presented and explored by (Weick, 1979, 1995). Equivocality is the existence of multiple and conflicting interpretations of possibilities making yes and no questions impossible in the sensemaking process that is the center of attention of Weick (1995:92). Equivocality is described as stemming from confusion, and can be resolved by applying more information of a different kind, whilst constructing and negotiating new information in a dialog with others. My case study shows a high degree of uncertainty (lack of knowledge) but also equivocality (multiple interpretations), which, in the case of Leap, is what makes it special and holds great potential. The focus for Weick (1995) and Brun and Sætre (2008) are how equivocality and uncertainty are reduced. However, experiences from the Leap case show it has more to do with learning and allowing a front end project to embrace the equivocality, hence also in the organizational structure finding a way to embrace the different types of knowledges in regard to a conceptual idea.

It is worth reiterating that the COO explicitly stated that there should be a great difference between explorative and exploitive development, and that the organization needed to have both. Furthermore, the case clearly illustrates that it is by the embracing and the utilization of equivocality in regard to the organizational understanding of concept development, thus multiple development approaches, that allows for new development opportunities to appear. Take, for example, the development model. It is officially developed as a process tool for managing the development process and to aid the developers as providing development guideline approaching deadlines (to ensure progress). However, in the Leap project, it is very clear that its main purpose is disregarded and the main goal for utilizing the development model in Leap is to establish a way to communicate and align oneself with the rest of the organization through acknowledged terminology. Another example of equivocality is the perception of the market. Many embedded visions of how customers behave, and what the market wants and does not want, are present within the company. This makes knowledge about the market multiple depending on which perspective on the market that is enforced, with what purpose, and from what perspective. When these alternative market possibilities are staged in a project like Leap, the dominant market perceptions are challenged and new development opportunities appear by putting it in another perspective with a different mindset. These new development opportunities, however, will, for many reasons, have a rough path

going into the exploitive development division if it reaches this stage, as it will collide with the structures and embedded standards for what a good concept project is, which has been built up over many years. My point is that the case shows that Leap embraces the uncertainty and the equivocality as a necessary means for pushing the bar for what is possible. They work from an explorative perspective, where failure (in the sense that the project is shut down) is a possible outcome, but also that it is okay, as the project will then build on the learnings from one project to another. In this way, the uncertainties inform the explorative, and ideas are researched and tried. There is, in the case of Leap a development space staged, where the focus is to embrace exploration of the conceptual ideas. This is accomplished by operationalizing the equivocality of the market and the organization into alternative development tactics in explicit and implicit enactment strategies. I will later propose how this informs the possibilities for enabling front end.

Drawing parallels to the case presented, I think it is worth expanding upon another perspective on this matter, a perspective that pays favor to the idea of having a front end that is different from that in the exploitative development. In the case, it is clear that there exists a special skillset of sorts that allows the actors involved in Leap to perform development activities that are configured in terms of new and innovative development ideas. At the same time, to some degree, they manage to be seemingly aligned with the organization and its rules, which provide the project with the mandate it needs in order to acquire resources and progress though the system. With the basis in the case, I think that it will make sense to further explore how one (the actors involved in a given project) navigates through these uncertainties and equivocality that are present in the early stages of development. Navigation, in relation to enabling front end on the premises of being explorative, makes it interesting to elaborate further on Weick's (1979) notion of enactment, as a means for understanding how front end can be staged and configured.

This calls for a certain type of actor to be able to navigate and embrace all the fuzziness in a process, turn it into something feasible and applicable, and allow it to be fuzzy whilst working around it. In the case study and the ANT ontology, I find it interesting to explore how front end is yet still managed despite rather high levels of uncertainties and equivocality; both in relation to the concept but also in relation to how to perform in regard to the organization and its embedded elements. The ANT perspective will present a different problematization and understanding of how to enable front end.

OPPORTUNITIES FOR FRONT END

Based on the case, there are several instances of interest to the discussion of how to enable front end in an organization, thereby embracing and utilizing the ambiguity as part of the front end development discipline. I will discuss how others have put the handling of ambiguity into play in regard to enabling front end as well as put forward initiatives from the case that have proven to enable it, and, on this note, elaborate upon them.

EMBRACING AND UTILIZING AMBIGUITY IN FRONT END

Weick (1995) introduces ambiguity as a combination of equivocality and that of uncertainties. Ambiguity, as well as equivocality, are reduced by applying more information; rich information. The argument is thereby that ambiguity is the carrier of rich information; multiple information which, in the early stages, can be utilized in the exploration of ideas. This is both in terms of the organization and its perceived rules and in regard to the development task at hand, where, in the Leap project, there seems to be quite a high level of ambiguity. In the case, this is exactly what has resulted in opportunity, as the ambiguity and its multi-sided information are manipulated in the actor collective into agency that has allowed front end to be performed in an alternative manner. It is this use or misuse of information that in the case allows for new initiatives such as Leap.

Garud, Tuertscher, & Van de Ven (2013) argue against the tendency of focusing and applying linear models such as Cooper's Stage Gate model, as it may reduce valuable assets in the development process as the unforeseen cannot exist within the model. On the topic of how innovation is enabled in the organization Garud et al. (2013:798) continue, "given these solutions, innovation occurs after considerable struggle despite (and not because of) organizing structures." Furthermore, they point to studies that indicate that innovation is enabled by harnessing rather than reducing complexity in the development process. Appropriate culture, processes and structures must be present, and as an example the co-existence of exploration and exploitation must occur together as a way of allowing the evolutionary perspective into the development. The focus is then to understand what the appropriate includes, as the different processes; structures and cultures are present for a reason. The focus and answer is not in disregarding the existing entities, but rather in making them perform in accordance with other agendas and goals.

EFFECT OF ORGANISING FRONT END OF INNOVATION

Organizational structures are, in relation to development, effective for some stages in the process, but regarding the front end, the case shows us that placing too much emphasis on organizing leads to the staging of other development spaces on the basis of, or in contrast to, the current and dominant organizational structures.

At this point, I must stress that I am not speaking on behalf of just creating an autonomous organization with no rules and no organizational structure. This has also been seen and tried in various companies, and another large Danish company has applied this structure to facilitate some of their most radical ideas. Up to a certain point, this is an interesting approach, as it seems that it is easier to stage the explorative development approach without being influenced with existing product platforms and business models. I guess Karl Weick would say that the levels of ambiguity are allowed to be rather high without consequences. However, there is a well-known problem when these radical ideas reach a certain point, where they have to be handed over to the well-established exploitive development division. This handover is made difficult because front end has been treated as something completely different to what it feeds into. Based on my case study, I will argue that the case company has the basis for something that can work, but that it is the premises of how front end is understood that should be up for grabs. And it is in this relation I identify how the support and organization can be approached differently.

One of the reasons for the success of the Leap project may be precisely that it is not part of the official established organization, but at the same time it is part of the organization. The point is that radical and front end activities are sometimes utilized by other companies or established as a new venture aligned with the main company in some respect. The reason I highlight this is that it is clear from the case that Leap has different constraints and conditions for conducting the development of new radical ideas than that of CD, who, for example, has the KPIs to take into account. Leap is, however, balancing a fine line between working around the established development structures and models and working with them in the sense that the ambiguity is utilized and manipulated into catering for the desired cause of the project. From the case, it is clear that it does not work in favor of an idea being too distanced from the main development organization, and this is why I refer to it as a fine line to balance.

EMBRACING AMBIGUITY AS A LEARNING OPPORTUNITY

There are the concrete rules, and then there are the social rules embedded in a development culture. The explicit difference depends on the division, but even across the divisions there is bound to be a development culture that lies deeper within the roots of the company, e.g. how the perceptions of the strategy are translated and understood: the perception of a good solution, the perception of best practice or the perception of what is possible.

In Leap, they work explicitly with trying to change, or at least challenge, the rules of how development is performed. This also includes embracing ambiguity as an enabler of the explorative instead of something that needs to be reduced. Furthermore, the level of ambiguity is sought to be embraced by the project members and is illustrated nicely by this quote by one of the developers when asked about an episode at one of the morning meetings:

> *"In some things that I say I will get a lot of resistance, and feel like maybe that was not the smartest thing to say. But I try to hold onto the idea of trying to also just talk before thinking, because I think it is sympathetic if you dare to say that in a group. Then sometimes it works, and other times it does not."*

The project is trying to empower a different approach and development culture, where there is less focus placed on not failing and therefore taking the safe path. It is about changing the perception of failure. Failures should not be perceived as allowing ambiguity to exist in the early stages of front end, but instead changed into the basis for insightful and interesting discussions and possibilities. In the case, I have described the culture that exists in the organization implicitly, where a project that is shut down for some reason is regarded as failing. There is one developer who has had the bad luck to have only worked on projects that have been cancelled at the G2 gate. This is something of which his colleagues are aware, and it is not regarded as a quality. I have not looked into these cases specifically, so I cannot comment on the reasons for the projects not being moved upon, but I will, in this discussion, include the fact that success is measured on the progression of the projects upon which a developer is working. Leap has tried explicitly to work around this concept of success and utilize ambiguity as the carrier of rich knowledge to the point captured in the quote above. Success is defined as to wonder and explore, and, in this way, find new development opportunities. The mindset is that if an idea does not work, then they have learned something that they should build on. They should not regard it as a failure,

and begin all over again; it should be regarded as a stepping stone for the next task or project. The project manager for Leap explains the traditional way of perceiving success in development projects versus the success in the Leap project as seen in figure 22 in the previous chapter. This is also a break with the normality and perception of the development in the mainstream exploitation organization.

In relation to learning, (Levitt & March, 1988) point out that it is evident that an organization needs to learn to learn and expand what they know continually in order to keep up their competitive advantage. If this aspect is not a momentum in focus for an organization, Levitt and March (1988:332) state that there is some chance that the organization will be incapable of coping with environments that cannot be arbitrarily enacted and thereby do not fit into the system and will be disregarded. The organization and the way of doing things should only be a picture of best practice based on the last project, and should therefore always be up for negotiation in relation to the possibilities presented.

However, the biggest ambiguity and challenge for Leap is the relations and role it has to the rest of the organization. If it is a concept project, then why does it not have the same conditions as the rest of the concept projects? There is a great deal of confusion in regard to this matter depending on who is asked in regard to why, and what it is that Leap is doing. It is both the weakness of the project and, at the same time, a great strength, as the developers and the project manager in particular apply certain strategies based on the ambiguity when staging the development space. The ambiguity is utilized as an advantage for the project. The project manager has a key role in turning the ambiguity of the organization into an advantage, as it is how the different models and the awareness of the presence of embedded latent factors are staged, which makes this project an alternative to front end as practiced in Concept Development (CD).

STRATEGIC NAVIGATION THROUGH THE ORGANIZATION

Brun and Sætre (2008), discuss ambiguity as something that, in development, should be reduced, in the sense that successful development is possible when those factors are at their lowest. Reducing is done by making it explicit and therefore applicable for dialog and, through this, testing. I will, however, continue to argue that embracing and utilizing ambiguity is an important aspect of front end, and how it is still possible to stage a development space

where it is handled. Another strategy to this is creating alliances and, through doing so, embrace and allow certain aspects of a project to stay fuzzy yet approachable, by making fuzzy tangible for all actors in the project. Tangible, in this sense, does not necessarily mean physical, but rather it is something that can be objectified and therefore exists as something to talk about, which will allow communication and through this enable front end.

It is important to be in alignment with the organization at some level, as it is the rest of the organization that will ultimately be the judge of a good or bad project. (Kijkuit & Van Den Ende, 2007) describe a framework that builds on making sense, mutual understanding and consensus formation as part of developing early ideas and selecting best opportunities. Again, there is focus placed on reducing the ambiguity, but the sensemaking adds another level to understanding the process of creating a conceptual idea that will progress all the way to the mainstream exploitive organization. Kijkuit and van den Ende (2007:868) note, "*Whether an idea is accepted is thus not only dependent on whether a generated idea meets some predetermined criteria, but also on the shaping of the idea (…)*". The shaping of an idea is understood as a process of including several different actors into the making, shaping and understanding of an idea. It is the negotiations and sensemaking amongst these actors that takes part in shaping the idea, and it is precisely the mutual understanding from different actors that is the essential ingredient in shaping ideas that will be accepted further on. They refer to it as creating a mutual basis, not to be understood that everybody knows the same, but rather as everybody works from the same premises towards some common goals. Furthermore, Kijkuit and van den Ende (2007) state that an idea is only valuable if it is collectively desired, as this will make the concept progress.

In my case study, I have described how key actors in the project build alliances throughout the organization. They do so because they have experienced a need for it, but they were not explicitly aware of the importance of this tactic. It was interesting to observe how this recruiting of key supporters was played out throughout the organization and how it was discussed amongst project members regarding who ought to contact who and how, based on previous relationships with these persons of interest. This point from the case, one that is very well elucidated by Kijkuit and van den Ende (2007), is that it does matter who is in the leading role in these early stage development projects. I am inclined to say that an introverted domain expert with a very good idea would have a difficult journey toward getting the idea through the rest of the organization if it did not fit into the portfolio strategy. In the case, it is clear that the shaping of the idea by including various actors is important for the

progression, and the continuity of the acceptance of the project. In Leap, another strategy is applied in relation to establish supporters for the project. By strategically informing the potential future developers and keeping them in the loop of the project, they create a pull effect from the main exploitative organization; initiating a potential part ownership of the project from a relative early stage. This hand over has, historically, been a difficult aspect in the company, as it is not desired to have ownership over a project where the potential is difficult to grasp and thus believe in. On this note, I will also point out the development culture that stresses that a project is a success if launched and a failure if not – as crystalized in the *chamber of failed projects* that are part of the introduction for new developers.

Kijkuit and van den Ende (2007) introduce two types of network perspectives; the structuralist and the content. The latter is characterized by the attribute of an actor, which may be expert knowledge. The structuralist, however, is the networking that goes beyond the content in focus (the project in the case). This is interesting as it is clear that the project manager has important relationships and networks with upper management. He himself is very selective in which relationships are prioritized. The project manager acknowledges middle management in BI and CD, but does not acknowledge them as being important in relation to his project, and they are, from his perspective, included on a *need to know* basis, when they *need to know,* as a means for them not to interfere. However, it is different with the management in the exploitive organization (product innovation, as they are kept closely into the loop despite the fact that they are not the owners of the project in that particular phase. Furthermore, Kijkuit and van den Ende (2007) describe this as having weaker ties to some actors that only require a minimum of communication which allows for more of these type relations. The stronger ties come with a commitment, and require well-developed communication that is tended to on a regular basis. This type of network is characterized as building on trust which is, for example, clear in the relationship between the project manager and the vice president of PI. They have stated in several instances that they trust each other to do the job, and trust each other to have the right set of skills and visions that will allow the project to succeed over time, thereby enforcing the agency established in the Leap actor collective.

Levitt and March (1988:327) describe how higher level management are more reliant on ambiguity in the information than lower level management, as their role is to navigate through options and steer in the right direction. This also informs the strategic relations that the Leap manager has put emphasis on. The COO is interested in something that can guide him to take the right

decisions in regard to strategy and therefore also potential. Middle management such as management for BI is more reliant on complying with the system, where the incentive is to reduce ambiguity and is measured in KPIs. This comes down to what is at stake for the actors involved, what drives them and how it is elaborated in an agenda.

CHALLENGING THE EMBEDDED ORGANIZATIONAL INCENTIVES

Garud et al. (2013) have accounted for what they believe to be an appropriate topic for future research in regard to getting to know how innovation processes are made even more suitable for supporting the development of innovations. They point to the issue of implementing the early stage development into the main organization, the organization facilitating the exploitation development, and that common research has described that the implementation of such innovation processes are not simple, but is obtained over time by translations, re-inventions and re-contextualization (Garud et al, 2013:800). This implementation or *handover* of an explorative project to become an exploitative project is, in my case, a key issue for understanding the premises of front end. The handover represents many elements on many different levels. For the developers working in the front end, it is the end goal and represents how they are measured. This may be prompted by a bonus, but also internally in regard to being perceived as a successful developer. This is seen from the perspective of how the latent development culture is influencing the development practiced. Furthermore, the handover to PI represents KPI for middle management, who are dependent on the passing in order to have bonuses released. Moreover, for the division as a whole, as described in the case, the division of BI and CD are constrained by having to provide a fixed number of projects to pass the handover gate in order to be successful in the official eyes of the organization.

The handover has, however, proven difficult and thus influences how front end is perceived and staged throughout the entire process, as the passing of G2 is where the explorative project is evaluated. The implementation is, as Garud et al. (2013) refer to, important to further investigate, as it is, in the case, very strategic for the parties involved. The project manager has a direct communication line to the vice president of PI, who is the receiver. He has a direct communication line to the COO, who is known for interfering in regard to which projects are approved for advancement at G2. There is, as described, a focus on creating alliances and enrolling persons of interest from within the PI division. This is a way to create ownership of the idea early on, and to foster

a readiness for the project to be handed over, thus creating a pull effect. Another activity implemented by the Leap project was Tuesday breakfast. Every week they would sit down and talk about the status of the project and the activities within the project in the week to come. This was done in the open, and many people would comment on the cosiness of the setting as they passed by. The project was considered out of the ordinary by doing this and something that others noticed. Furthermore, as described in the case, they would use these breakfast meetings as a forum to embrace prospective developers to include them in the ongoing discussions to get their input and to allocate resources to the project. The point with all of this is that the implementation of the idea in the further innovation process is abstract in the sense that it occurs at many levels, making it difficult to define and operationalize within a system, as it is dependent on factors such as human beings and their skills for interaction and networking.

The case shows an interesting element in the sense of bettering the implementation and bridging between the explorative and exploitative. Even though there is great focus on this specific gate and the official handover, it is not sufficient within the basis in the case to only look at this gate as an isolated event for success or failure. In contrast, sometimes *the handover* of front end to exploitation is perceived as coming with resistance (Garud et al. (2013:801). In the nature of front end and the exploration that is asked, projects stemming from the front end divisions may be difficult to handle in the well-organized and systematized exploitative divisions. In the case, this division has recently been streamlined in respect to the lean principles such as described and elaborated by Liker & Morgan (2006)in relation to effectuating the exploitative development process (Haque & James-moore, 2004). Thereby creating a focus on the effectiveness of getting a development project through the system by inducing focus on taking out risks and reducing all that is not directly applicable to the development. Uncertainties and ambiguity in a project do not go well with these principles. The PI organization is evaluated in respect to the lean principle, and projects coming in from BI can be difficult to place in the PI system if they are too radical and thereby not similar (enough) to previous projects. The actors in the front end sometimes describe this as the *conservatism* of the people working in PI, and that they are not able to see the potential in the projects. On the contrary, as Garud et al. (2013:801) describe: "(…) because existing structures that allow for exploitation of ongoing activities may be disrupted, and so will generate resistance against novel ideas". The structures in PI are streamlined, and the employees measured on performance that is again measured in effectiveness. In PI, there is a belief that BI does not provide innovative projects, innovative

in the sense of radical new ideas that come with a great market potential. PI has a demand for projects with such a potential, but when it has been provided by BI, the projects often end up on a shelf or are shut down as they have too many risks and uncertainties.

The paradox when summing up is that BI thinks and acts as if PI is not ready for and able to grasp innovative projects, and PI thinks that BI is not capable of producing innovative projects for them to work on. With an analytical offset, what I see is at stake in this case in particular, is that the front end division is evaluated on the basis of a fixed number of projects to pass through the G2 gate (the handover gate). It is in the nature of BI to adjust to producing projects that will have a chance of passing this gate. The gate is passed by PI accepting that the conceptual work in the project is done in accordance with their standards, which, for instance, includes accounting for the risks. As PI is evaluated on effectiveness, projects are evaluated on how well and easily they fit into the development model as practiced in PI. Furthermore, BI is adjusting their development activities and ways of doing development to be more like the style practiced in PI. All of this leads to highlighting one of the problems: that of having a development division with one agenda in front of another with a different development agenda, as the alignment influences the development across the boundary. Even though, on a higher management level, there is a demand for both types of development, the actual performance is different.

CHALLENGING THE AGENCY OF ESTABLISHED ACTORS

(March, 1991), describes and argues that refining exploitative development processes more rapidly than explorative development processes is likely to make the development more effective in the short term, but will be self-destructive in the long term. The scope for the two different types of development is different, but present in the same organization as they compete for the same resources under the understanding of more for them, less for us. March (1991:71), further describes that an organization will make implicit and explicit decisions between the two divisions: the explicit in the form of strategic decisions and the like, but the implicit choices are, as he describes it: “buried in many features of organizational forms and custom, for example, in organizational procedures for accumulating and reducing slack, in search rules and practices, in the ways in which targets are set and changed and in incentive systems”. During the case study, I have shown a variety of such features, and I will elaborate further on how this affects the development opportunities.

March (1991, 1994), studies how learning is performed in the organization, how it is utilized, or vice versa. My perspective is more in regard to how this knowledge is made tangible in relation to the development, and therefore how it influences the perceived development opportunities. March (1991:73), describes how "organizations store knowledge in their procedures, norms, rules and forms", and this storage of knowledge is interesting in light of trying to explain and understand why an initiative such as the Leap project emerges.

Predefined, and as a premise for establishing the organizational structures as they were when conducting the research, was the COO vision of two different approaches to development; that of exploration and exploitation. These are quite different development approaches that are equally important and represent two very different facets of conducting and facilitating good development. There was an organizational change, and, in theory, all divisions were changed and established in new ways; however in practice, the PI division had been streamlined with a focus on effectiveness. The PI division was the main player in the organizational change, and a division such as BI and CD was established in relation to that of PI. The point is that BI is established in the context and relation of PI, and this is where the description and distinction of March's (1991) explorative and exploitative is relevant for understanding what is at stake in the two divisions individually, but also in relation. The case company is market leading, they have great success on the market, but can always be better, and always expand markets or take in new ones. Throughout the years of obtaining this success, the development organization has changed many times in order to cater for different needs.

What I am trying to highlight, is that the perception of the markets, the users, and, to some extent, the technical possibilities, are embedded in the minds of the developers and are unconstructively and non-strategically staged in the various projects. As an observer, I quite often encountered the same conflict at different places in the organization in regard to the perception and possibilities for the Leap project. In everyday parlance, most people who knew Leap existed, and would describe it as working on radical innovative ideas; defined as creating new technology for new markets. However, another mindset was brought into the project, a mindset that would not recognize the project as innovative, as it was perceived that it worked with something that had been tried before, or that the technology would be similar to something else in another project with another purpose. The interesting aspect is that just because it had been tried some years ago and failed, it was still perceived as a failure, not taking into account the different developers working on the

project, the different time, the different market, the different application of technological possibilities.

Bringing knowledge and experience across the organization via the many projects was perceived in two ways. In Leap it was primarily perceived as an obstacle and a moment of irritation to the majority of the developers working on the project. In the organization in general it was, in contrast, highly valued and referred to as a valued experience and would empower those employees to speak with great authority in many of the usual conceptual projects carried out in CD. The case then adds to the understanding of how and why it is difficult to have both exploration and exploitation projects in the organization and actual support for both of the intended development perspectives. As I have stated several times, the established and existing organization will have a great impact on new initiatives and will enact the old perceptions and habits despite new structures, paradigms, methods, tools, processes etc. I am not exploring this as a way of pointing my finger at something, but would rather that this serves as an element in my argumentation for why front end needs to be studied differently in order to understand how to enable it as exploration and something different from exploitation.

March (1991) describes the internal battles between the different divisions in the organization as battles of who is more important. The fact is that they both are, and the problem is that the one is defined in relation to the other. It is difficult to balance the *them and us mentality*, when it is, in fact, the company's general interest that there is common ground for all. However, the different incentive structures and criteria for success in the divisions make a common goal difficult to grasp, as a competitive element must be regarded in understanding the different approaches to reaching to desired goal. March (1991:75) further describes it as a code that lies within the company, a code which will, throughout the years, be refined as projects succeed. It is this code that will ultimately determine what we think of something and therefore choose to do. In the case company, I think that my presence and my out of the ordinary questions informed this discussion of a potential code even further in an explicit way, which is important in order to organize for and enable the front end to be explorative.

EMPOWER KEY ACTORS

The case points to the importance of specific actors when staging alternative development spaces for front end. The Leap manager and the vice president

of PI have, throughout the case, proven to reflect opportunities for enabling front end. I have previously distinguished them from having intrepreneurial characteristics as the navigation within the organizational structures has proven to be important, therefore influencing the reference to intrepreneur. Leifer et al. (2001:106), however, call these key actors opportunity gathers and idea hunters. The opportunity gathers are those who dare to begin some out of the ordinary structures, and are able to do so by strategically ensuring management support. This also entails that it is not possible for just anybody or anywhere in the organization, but that it takes a special skillset and the right relations. The idea hunter has the cross-functional competencies to not only recognize a good idea, but also attract management's attention and support. In the case it shows as the Leap manager enrols the entities and the actors into his actor collective that gives it agency to argue for Leap's existence.

The COO confirms that there is a need for people like the Leap manager in the organization, but also recognizes that they are hard to find, and, if found, hard to keep. In the mind of the COO it is definitely a question of competencies, and that the Leap manager has previously proven his worth in other projects. The COO does not, in this instance, believe in just handing the mandate to any developer, as the struggle is to some extent part of what it takes to dive into the explorative innovation. The people who are given the mandate to do the exploring need to be driven by something other than what the structures and boxes of right and wrong can provide, in this case the incentive structures.

The COO in the case study acknowledges that the company continually needs to be *stretching*, stretching towards the ability to create new ideas or to embrace new competencies as an enabler for focusing on other perspectives (McDermott & O'Connor, 2002:429). If the organization does not stretch it will be locked into continually re-enacting the same development opportunities over and over again. The organization needs to be challenged in order to evolve.

McDermott and O'Connor (2002:431) further describe how radical innovation projects are often seen as moving away from the radical side of the project in periods of progress in the system and not worrying about accounting for the uncertainties. This is an interesting tactic in relation to some of the choices that the Leap manager has taken. Given the relatively new focus on technological platforms and their architecture serving as the basis for development, the Leap manager elaborated the Leap project to be a potential

technology platform. In practice, I think it was a countermove made because he was being asked to include other technology in his project. Instead of having to incorporate something into his project, he proposes that someone else can incorporate what he is working on into theirs. However, it is a strategic move to argue in the same terms as the organization. McDermott and O'Connor (2002:431) point out, that managers of radical projects often struggle with establishing a valuable boundary to the main organization, and the argumentation of the Leap project being a candidate for a core technology is an example of such a valuable boundary. It is easier to recognize such aspects retrospectively, but identifying these in situ and with the ability to act is valuable in the understanding of how these key actors play an important role in the enabling of front end. (Akrich et al., 2002)

Over the course of this chapter, I have discussed and analyzed the case by diving into understanding why front end is perceived as difficult and how, despite these difficulties, it is still enabled. By charting some of the experienced difficulties for front end, I render it possible to explicitly utilize them in enabling strategies for front end. On the basis of the case study, I have outlined empirical examples of how strategies for enabling front end have resulted in multiple front end performances supporting the development of different front end opportunities.

CHAPTER 6 - ENABLING

The understandings and discussions brought forth in the previous chapter will serve as the basis and building blocks for what this chapter will explore. I will draw up the lines for how I think front end can be discussed and understood as an alternative to the many normative and singular understandings of this phenomenon. I will introduce and describe concepts that I hope will help inform the discussion of how front end activities can be enabled in established mature development companies. I am not proposing a new normative solution as to how front end of innovation should be performed. Instead, I propose a concept and thereby an alternative way to perceive the possibilities and problems for facilitating front end activities. I will, in the following, draw attention to the path dependence and path creation discussion such as elaborated and discussed by Garud and Karnøe (2001). However, I will first introduce the basic understanding of path dependence as a concept, and thus argue why this concept is not applicable in my case being informed by an ANT ontology. However, the phenomenon of path dependence is still interesting to pursue in relation to path creation. Secondly, I will introduce the development constitution as a conception that embraces the opportunity for multiple understandings of front end, and thus the embedded complexities of front end. Thirdly, I will draw attention to the case, and through this demonstrate how the concept of a constitution of development holds agency and how it serves as the basis for performing front end in multiple ways. In the construction of these concepts, I will argue on the basis of the ANT ontology, and thus elaborate the conception with empirical examples to put the understanding in perspective and demonstrate the applicability in relation to front end in established mature development organizations.

PATH DEPENDENCE

"Path dependence (PD) is a central construct in organizational research, used to describe a mechanism that connects the past and the future in an abstract way". (…) Path dependence concerns increasingly constrained processes that cannot easily be escaped". (Vergne & Durand, 2010:736). PD is an important construct for the scholars in organizational studies, and many have written and discussed this phenomenon. However, there seems to be a lack of clarity on an actual definition of path dependence, path dependency, or path-dependent processes. Vergne and Durand (2010:737) classify path dependence as having been defined in three levels: "At the macro level, institutionalists use path

dependence to account for (harmful) institutional persistence. At the meso level, economists rely on path dependence to explain suboptimal governance or technology outcomes. At the micro level, the dynamic capability view refers to path dependence as a surrogate for organizational rigidity while paradoxically insisting on its positive impact on competitive advantage." On the basis of this classification of different levels of Path dependence, Vergne and Durand (2010:737) propose a definition of path dependence as: "a property of a stochastic process which obtains under two conditions (contingency and self-reinforcement) and causes lock-in in the absence of exogenous shock." Vergne and Durand (2010) distinguish themselves from other definitions by building on existing definitions and put emphasis on the two conditions necessary to obtain path dependence: contingency and self-reinforcement. They argue that, on the basis of focusing on contingency and self-reinforcement, they add to the understanding of path dependence as it will be an explanatory construct.

There seems to be an understanding that the process that PD represents is important, yet not only captured by the conception of path dependence. Vergne and Durand (2010:738) describe it as: "For example, we know that what managers learn today influences what they will be able to learn tomorrow (…)" Changes are usually incremental rather than radical in larger organizations, so today are often influenced by yesterday's rules. It is the core of this phenomenon that is interesting; it is natural that we learn from what has been tried before; otherwise it would be impossible and practically ineffective to run an organization.

The two conditions that are the explicit addition to the PD definition are contingency and self-reinforcement. Contingency thus informs path dependence as influencing the potential of a particular process: "(…) path dependence occurs when initial conditions are followed by a series of contingent (or chance) events whose influence on the path taken is larger than that of the initial conditions themselves. (…) by contingent we mean unpredictable, non-purposive, and somewhat random events (…)". (Vergne and Durand, 2010: 741) Contingency in relation to path dependence is then the events that are not focused for a specific task or process, but greatly influence the outcome, sometimes, I dare, to add unintentionally and latently.

The other dimension is self-reinforcement, and is, by Vergne and Durand (2010), explained on the basis of the QWERTY keyboard example, and is therefore very specific in the product specification. "Learning loops for QWERTY users do not only make QWERTY more attractive, but also

alternative keyboards less attractive, because of the time it would take to reach the typing performance of an advanced user on a new system. Thus self-reinforcement, to be effective, needs to include at least one negative externality to decrease the attractiveness of alternative paths."(Vergne and Durand, 2010: 743) Self-reinforcement represents an explanation of why certain (in this case) product characteristics are sustained, and therefore repeated and manifested as the go-to solution. Path-dependent processes can therefore be understood as adopting processes, where one may end up becoming the dominant. However, in my case, it is difficult to apply this understanding, as it is too flat in a sense and the premises for understanding why and how such a phenomenon exists; namely, the definition elaborated by Verge and Durand and other previous scholars is not compliant with the ANT ontology. The ANT ontology will always attempt to understand several layers of the actor networks and the motivation and incentive for being. In the definition provided by Verge and Durand (2010: 737), actors are not accounted for; it consists of contingent events and self-reinforcing processes that just occur. ANT would propose to understand how such events would take place by studying the actors involved and their construction of actors and actor collectives' holding agency.

Therefore, in order to be able to elaborate how front end can be enabled in the future, it is difficult to only pursue the PD definition, as it is explanatory of what is and why, and not what can be in a progressive sense. Taking the PD perspective, it would be difficult to conduct a case research study in situ, as this thesis presents. PD is instead well suited for tracking down the reasons why a product resulted in a certain outcome such as the QWERTY keyboard, and in retrospect why it is maintained as it is. The discussion of whether PD can be empirically supported and verified is important in relation to this notion's credibility, but it is, however, not too important for this thesis, and I will not enter this discussion per se, as I will merely adopt PD as a phenomenon (representing yesterday's learnings) and not as a notion nor conception that can be studied and understood from an ANT ontological perspective. From this viewpoint, it serves as a conceptual idea that it exists as a phenomenon, and therefore in ANT takes part in the shaping of agency.

The criticism regarding path dependence is the fact that it is deemed to be too rigid, and as something that explains the development opportunities just by being. (Garud, Kumaraswamy, & Karnøe, 2010:762) explains it as: "we see no problems with others using path dependence to explain both the persistence of an existing institution as well as the creation of new ones". In a simple manner, this frames the phenomenon that PD can represent, which is

meaningful in order to better grasp why and how development in the front end occurs. The phenomenon in an ANT perspective will influence the agency of an actor network with knowledge in regard to past events, and draw up the foundation that development in mature development organizations is not conducted from a blank sheet of paper, but rather that other elements influence the possibilities, elements that need to be accounted for.

Path dependence has an origin in the economic innovation literature and is therefore lacking the dynamics and the temporary state, not to mention actors that are necessary when studying socio material actors that change over time. From an ANT ontological perspective, the path dependence theory is difficult to grasp, as it lacks the socio-material element in relation to what it can perform. In ANT, everything is constructed, and even though it may be perceived as stable, changes can occur on the basis of construction of new actor networks in relation to the translation process (Callon, 1986). ANT represents and depicts temporary and situated networks and does not accept a notion such as path dependency to just independently exist as an entity causing actions. ANT will perceive PD from the perspective of translating different meaning into new or existing networks and thus foster actions. It will, in contrast, not understand it as a path of predefined events that are not changed over time and do not consist of heterogenic socio-material actors. I see fundamental aspects in PD as a phenomenon that, in ANT ontology, inform a conception that is enrolled in the actor network and, in this relation, put front end in a perspective where the complexity of front end is challenged.

Path dependence has been used to analyze cases from the creation of Silicon Valley to the problems in organizational change. “These studies provide excellent accounts of how specific institutional orders emerge and become stabilized”, (Garud and Karnøe, 2001:5). I dwell on the word stabilized, which might work for analyzing something in the past, but will not work in order to understand and further elaborate the mechanisms that are enabled by constructions of actor networks in relation to development agendas in the front end. Path dependence is applied as a fixed entity that creates actions and thereby influences future actions. Garud and Karnøe (2001:1) describe it as, “Path dependence celebrates the role of chance historical event in shaping the flow of future events.” They refer to it as a process perspective, where something happens because of something else. It is to be seen in contrast to their conception of path creation that serves as dynamic process understanding where the interesting aspect is understanding how agency and thereby action are constructed over time to influence what is done tomorrow.

Lock in, in relation to path dependence, represents an interesting phenomenon. In path dependence lock in indicates that a path has been established as the dominant one, and will continue to be so until the experience of an exogenous shock. Lock in can be on any given path as path dependence by the definition of Vergne and Durand (2010) is contingent, which may not necessarily be on the optimal path. This definition of *lock in* is relevant to discuss in relation to the enabling of front end. Lock in is understood to be when a development process will proceed as the path dependence dictates. In an ANT perspective, this is explained by the actors mobilizing networks with strong agency that construct that specific development path repeatedly by being the construction of agency in actor collectives. This can only be disrupted if the development process encounters what they refer to as an exogenous shock; a shock that is not embedded in the path dependence understanding and thereby from definition comes from the outside. Applying lock in to the understanding of the case provides a perspective to understand the reasons for the different development decisions, such as why the front end division BI performs development as they do. Equally, it provides an understanding as to why Leap, as an initiative, can be perceived as an exogenous shock that has constructed alternative actors and an agency that has begun an internal reflection and adjustment of the development activities. Again, the phenomenon of lock in and exogenous shock is interesting, but is not, in the mind of an ANT researcher, a conception that can be studied, as the argumentation is different. Lock in would be perceived as the stabilized actor network of social material elements that have agreed upon a specific path, this will continue (yet sensible over time) until an alternative actor network will appear and challenge the stability by alternating the agency held in the actor collective. It does not have to be exogenous as such, and it is again important to note the socio-material that ANT brings into an understanding, implying that the destabilizer can be human and nonhuman or a heterogeneous actor network. It does not have to be a new exogenous actor network, in the mind of ANT and the temporality that this entails, it will simply address new actions which an actor network by agency can induce.

PATH CREATION

Path creation is an alternative to path dependence and is presented by Garud and Karnøe (2001, 2010). The existing discussion is whether path dependency or path creation is more appropriate, but having just characterized the path dependence as to be seen as a phenomenon and in the perspective of ANT, I

see that the two as being complementary. Garud and Karnøe (2001:1) "In contrast, path creators are boundary spanners who disregard myopic pressures from existing relevance structures by making mindful deviations". In this description, the path creators are described and understood as an active and explicit strategic move, where different paths are chosen in order to obtain something different (new). In contrast to the understanding of PD, where the events were contingent and bound to history, path creation is not. When using a boundary for understanding path creation, I do see a need for further investigation of what it is the boundary of, which aligns with the phenomenon of path dependence, or the existing of a foundation from which a path can be created.

Path creation is not about just doing whatever anyone finds fit, i.e. creating an autonomous approach for development, there needs to be a balance between following the rules and processes and going rogue. Accordingly, Garud and Karnøe (2001:3) describe: "Path creation does not mean entrepreneurs can exercise unbounded strategic choice. Rather, entrepreneurs are embedded in structures that they jointly create and from which they mindfully depart. Mindfulness implies an ability to disembed from existing structures, defining relevance and also an ability to mobilize a collective despite resistance and inertia that path creation efforts are likely to encounter". This outlines many of the perspectives that are at play in the case when the focus is on what makes the Leap projects successful, or at least what makes it different from that practiced and enacted in the context of the development divisions in the case company BI and PI.

Garud and Karnøe (2001:3) further elaborate: "By stressing path creation we want to draw attention to "phenomena in the making". I like the phrasing of *phenomena in the making* as it emphasises the temporal and the fragility, which I think is important when understanding how these new types of development opportunities are constructed on the basis of negotiations. Garud and Kanøe's path creation rests on the principles and ontology of ANT, where translation and the creation of a shared and common space is the key proposition. This shared space is obtained by presenting ideas that are understandable by others, and the idea may be argued strategically differently from actor to actor. At different times the shared space occurs as an attempt to enrol others into the actor collective by addressing their specific interest in being included in this network. Here, it is important to note the multiplicity that is possible, as ideas are presented differently at different times for different actors. Path creation is strategic in the sense that it is a dynamic conception that describes the motivational structure for how different actors

get others to do as they do, and thereby create (new) paths for development. For many reasons, the notion of path creation leans toward what the entrepreneur needs skill-wise. It is those who explore and seek the boundaries of the perceived optimal space for development, making small deviations resulting in alternative development opportunities.

Path creation describes how different opportunities arise. Not merely by chance and of contingent events, but rather by actors with the skills to make them happen. Garud and Karnøe (2001:15) describe them as the entrepreneur: "Social skill is the ability to relate to the situation of the 'other'". (…) Skilled social action revolves around finding and maintaining a collective identity of a set of social groups and the effort to shape and meet the interests of those groups." When described as such, path creation makes it that much more interesting to dive into the different elements that can act as interessement devices, and how they are mobilized and enrolled into serving a specific (or multiple) cause (that of alternative development opportunities). Another aspect for understanding path creation is time. (Garud et al., 2010), further elaborate on time as a factor to understand and include. It takes time, is the part conclusion of the 3M case, where it is shown how the making of the Post-It note was indeed a process over time, where networks of alliance were built and rebuilt. To excel the novel ideas into innovation, time is a factor. In the Post-It example, it is evident to see that key actors are identified as being important for the path creation process of the Post-It. However it is difficult to identify how this actor managed to stage the actual development space that allowed the Post-It note to eventually be a success. In opposition to path dependence, path creation takes note of the actors involved; however, what I would find interesting to study in a case like the 3M would be how actors were constructed and enrolled into actor collectives, and how agency was formed and on what basis. In my case, it is clear that the reason for success so far is because of the multiple actor networks that are constructed in order to pursue certain goals, or allow for more slack at specific gates. An ability to mobilize time as a resource offers another key benefit that has to do with timing and temporality: “To mobilize time implies an ability to call upon" history" in strategic ways. It also implies an ability to evoke images of the future in strategic.” (Garud and Karnøe, 2001:21). It is these mobilizations that could be interesting to understand and thereby open up for how the actor network and agency is constructed.

Success in path creation that is creating alternative development possibilities is found in the following description for how to view the boundary spanning: “A key question is – How large should these deviation steps be? One answer is to

keep them as small as possible to avoid an escalation of commitment yet large enough to gain meaningful feedback. Such a process embraces a "real options" approach to the navigation of complex dynamic flow of events (…). That is, entrepreneurs are always attempting to embed out of structures that they are embedded in while re-using some of the rules and resources." Garud and Karnøe (2001:25). There are some very interesting points in the dynamic viewpoint and tactics in regard to pursuing the "right" strategic move. It will lead me to draw attention to Weick's enactment conception in relation to fully describing my case in regards to how front end is enabled in a mature development company with embedded path-dependent perceptions of development, as I see enactment as aligning well with the strategic reasoning for mobilizing actors as a means for creating change and alternatives.

UTILIZING PATH DEPENDENCE AND PATH CREATION

Path dependence as described by Vergne and Durand (2010) as a conception that explains steady state situations. In its definition, it is a predefined conception that is informed and where actors are placed into, as a means for explaining why the innovation process is as it is. Perceiving path dependence as a phenomenon in an ANT perspective is given agency, as actors are enrolled into an actor network and collective, as a result of the translation process such as described by Callon (1986). Path Dependence as a phenomenon that is given agency by its network is interesting to investigate in relation to understanding how configurations of a development space lead to multiple possibilities. With an offset in the case and the research questions, a conception such as path dependency will not allow me to study how front end is performed in multiple ways nor how front end is enabled. The phenomenon path dependence embraces what is often staged in the development space in CD and represents the prevalent interpretation of the development constitution. When perceiving the development possibilities as constructed by actors' path dependence, it will then include and speak on behalf of many entities that can be difficult to grasp, such as best practices for development. When looking at the case it makes sense that there exists such a phenomenon that represents and sustains certain aspects that many actors relate to in their argumentation for doing as they do.

Path creation is the dynamic process of enabling front end, and is applicable to the case that I have presented. Path creation also elaborates and argues on the basis of ANT, and the creation of the development path is constructed.

However, the level of detail when understanding path creation is difficult for me to apply in relation to unfolding how front end is enabled in the case company, and also how front end is perceived as being difficult to handle. Garud and Karnøe (2001), draw on the example of 3M when explaining path creation. This describes a series of events over time that, when concluded, have made the Post-It possible. However, it is difficult for me to identify the strategic moves of the actors and the enrollment and mobilization of specific actors in the collective that make alternatives possible. In relation to my case, I need something that can support the description of how strong actors and agency are argued and how they relate to others. In the case of 3M, path creation is argued on the basis of a retrospective view of a story, and, in this order, made sense of. In my case, there is a need for applying a prospective view of how such a path is created by the construction of strong actors and agency, and how they take a role in an organization that is constructed from multiple (conflicting) opinions. Furthermore, path creation is a study of how products (not constrained to front end) are developed and what influences this. My study is slightly different as I have studied how front end as a development discipline is enabled. In this regard, I also include in my focus how the organization or the development processes influence the front end development opportunities, which are shown to be important when studying front end in a mature development organization. The intention in my case is to show the richness of the explicit strategies for enrolling the various entities and actors as the basis for creating agency, and thus performance in the front end. From my perspective, Garud et al. (2010) have opened up the field of understanding for the early stages of innovation as constructed by many entities and actors, and that they dispose action depending on how they are staged. In addition, I wish to enlighten the different strategic enactments that have emerged in my study as an enabler of front end.

THE ENABLING OF FRONT END

In this section, I will argue through my case for exploring how a constitution of development is perceived by the actors, how it is constructed, and that it informs the development possibilities throughout the organization, and thereby how front end is and can be enabled. For this purpose, I will lean toward the phenomenon described by path dependence; however, I will unfold the phenomenon from the perspective of ANT, and show how this constitution of development carries agency and is an obligatory passage point when staging front end. The agency resulting in an actor collective is the foundation of many development agendas, i.e. multiple perceptions of the

development opportunities dependent on how the development constitution is enacted and how it is given agency by various actors in respect to the various goals and strategies.

CONCEPTUALIZING CONSTITUTION

Constitution is, in Western society, a strong and important notion as it associates with meaning and values that are present in our everyday life, which, in many instances, guides us (most people) in our perspectives of what is right and wrong. The constitution is something that we all have to relate to every day, and in the minds of ANT, the constitution serves as an obligatory passage point (Callon, 1986) when staging and enacting the innovation and development opportunities. When looking up constitution as a noun, dictionary.com defines constitution as comprised of the following elements:

	Dictionary.com	How it informs the Development constitution
1	The system of fundamental principles according to which a nation, state, corporation, or the like, is governed.	Organizational anchored processes, divisions for specific type of development
2	The document embodying these principles.	The development model available to all via the intranet. Negotiated document, written down by some, understood by others.
3	Constitution of the United States.	N/A
4	The way in which a thing is composed or made up; makeup; composition: the chemical constitution of the cleanser.	There are different elements in a collective that have agency. The different elements that are perceived by the actors to be influencing the development opportunities. (They will be elaborated later).
5	The physical character of the body as to strength, health, etc.: He has a strong constitution.	N/A
6	Medicine/Medical, Psychology. The aggregate of a person's physical and psychological characteristics.	N/A
7	The act or process of constituting; establishment.	Actively re-shaping the elements embedded in the development constitution or adding new elements.
8	The state of being constituted; formation.	When reinforcing and applying the principles to stage for development opportunities
9	Any established arrangement or custom.	The act of development is not random, it occurs on the basis of well thought-out and planned arrangements. Both in relation to structures and processes.
10	Archaic. Character or condition of mind; disposition; temperament.	The embedded culture in the company, and the previous experiences of the employees that understand and utilize the development constitution in the development process.

DEFINITION OF THE DEVELOPMENT CONSTITUTION

The development constitution is the acting fundamental principles for how to understand development opportunities within the company, it consists of many different elements/compositions that all relate to how development could be performed. The constitution is tangibly present by the organizational structures, innovation processes, models and templates accessible by the employees on the intranet and they therefore dispose for the actions of the actors.

DEVELOPMENT CONSTITUTION AND ANT

The development constitution is an actor collective that holds the role of an obligatory passage point (Callon, 1986). In this relation, the development constitution holds agency in regard to how it is enacted by other actors. The development constitution is situated and exists in the presence of those actors who let it exist by speaking on behalf of embedded elements. In the obligatory passage point as described by Callon (1986), it is the key actors (scientists) who make new agendas possible by mobilizing actor networks to "pass through" the obligatory passage point. In the case, I have shown how key actors also mobilize other actors into the actor collective or construct new actor networks holding agency supporting the new development agendas. Relating to the development constitution as an obligatory passage point is a successful facilitation of innovation necessary, but how the passing is performed is the interesting aspect in this.

The proposal of a development constitution is based on elements that, in the eyes of the employees, influence what development opportunities are feasible within the company structures. I will argue the existence of the development model through the various elements and perceptions going into informing the notion of a constitution. However, the principles are not embodied in a document per se, but the unwritten perception of what the constitution entails is given agency by translating the principles into rules for how development is conducted. When each of the developers enacts their perception of the development constitution, they sustain these principles to inform the development opportunities, and the constitution of development thereby acts as a constitution per definition. It is thus a metaphor, and I am not claiming that the case company had a constitution of development written down, but rather that there is a phenomenon that is continually enacted to perform on behalf of the principles and elements of a constitution. It is this conception that I will elaborate and propose as support for understanding front end in alternative ways and how I can talk about enabling.

(Grey, 1978:843): “In the first comprehensive treatise on advocacy,' Aristotle distinguishes between the written laws, the rules governing a particular community, and the unwritten law (…)”. In this quote Grey has, in these characteristics, introduced what he later elaborates as the unwritten constitution. The unwritten constitution is an addition to the written constitution that is officially practiced by law. The unwritten constitution is how law enforcement has interpreted the constitution into working practice. “Our judges have, as a matter of unarguable historical fact, developed a body of unwritten constitutional law-doctrine whose normative content cannot be derived from examining the language of the Constitution or investigating the intent of its framers.” (Grey 1978:843) The unwritten law is interesting, as this, from the ANT perspective, almost aligns itself with the agency that is embedded in the constitution as constructed by multiple principles and elements. These principles all contribute to how the constitution can be perceived, and thereby what it can do. The unwritten law in the context of front end contributes to the ambiguity of how development is and should be performed.

The definition of a constitution stated in item 4: composition is interesting, as it leads me to translate this into elements or entities that, when put together, will make up the constitution. This also means that the constitution as a phenomenon can be given agency to act as a whole, but also that each entity or element can be enacted and given agency if enrolled and mobilized in other actor networks. In this way, the constitution can perform in multiple ways; as elements mobilized in various actor networks or as a whole, which as a phenomenon gives agency to argue development in a certain way. However, it is important to stress that the development constitution is multiple, as the constitution only exists when the actor collectives allow it to.

THE DEVELOPMENT CONSTITUTION

The development constitution exists! It exists in my mind as a researcher, and is a tool for ordering and understanding the data collected. When I have spoken with my informants, interviewed or observed them, they have referred to the agency constructed by the entities and elements of the constitution. The tangible in the development constitution is the performance of actors that influence the development opportunities. They have not explicitly referred to the existence of a development constitution, but they have spoken of the facets that I have accounted for being included in the conception of a development constitution. Based on the case and the ANT epistemology, I will outline what constitutes the constitution of development, and with the ANT ontology in mind allowing for the emergence of socio-material heterogeneous actors to be studied in order to understand why development occurs as it does. Studying the socio-material actors allows me to study and argue on the basis of actor networks consisting of human and nonhuman actors, thus focusing on understanding how this network is constructing agency and what it can thus perform. A last disclaimer before outlining the conception of development constitution is that it should understood as dynamic. The development constitution is constantly changing on the basis of continuing translations of meaning, and thereby opportunities as a result of enactment. The definitions will never be closed circuited and well-defined, and nor should they. The constitution of development is a state of mind as perceived by the actors. It is a phenomenon that is time-sensitive and exists when actors need it to exist. Furthermore, it represents a perspective on what influences front end development, which, like the phenomenon of path dependency, represents the past, influencing the present, and will dispose into the future, where there might be other enactments or constituting elements to consider. This could be organizational change, the presence of new competences or new market conditions.

In my master's thesis project, I also studied front end of innovation in a larger development company, and they too had development models. Of these, one was dedicated to projects from the novelty of the idea until launch, and a second one the development of new technological possibilities. They were both designed to have gates and milestones that needed to be passed in order to progress. The difference was that one was dedicated to facilitating and supporting the development of radical new technical features, but was applied in many other instances for development projects that did not revolve around technology as such. The reason for doing so when asked, the project manager claimed, was that there was more freedom to do what he saw fit, and that he

felt that the management was more inclined to letting him be. This is the example from my master's thesis, and in its simplest form, it amply illustrates what I will now unfold as the existence of a development constitution based on the case study presented in this thesis. Kim & Wilemon (2002:31) describes how there are several factors that influences whether front end can succeed, but one important aspect is that it is aligned with the remaining parts of the organization; the strategical goals and the development agendas. I will show how a strategic enactment of the development constitution enables opportunities for front end that are otherwise perceived as resistant. Path dependence as a phenomenon will exist because actors allow it to by including it into their current development network, thus giving it agency. Therefore, when the different development spaces are staged, the knowledge and experiences of yesterday can be enacted and thus partake in the development space.

Figure 23 below illustrates a generic model for what has constituted the development constitution in my case study. This figure illustrates how there are different understandings of the constitution, and I will later argue how these different understandings are influencing the development via different enactments, leading to different development performances. It is important to emphasize the existence of tangible and non-tangible elements in the development constitution, not only when understanding how meaning is sustained, but also as an indication of how accessible the information is. The non-tangible elements are not officially phrased into a document, but rather rest on a series of events and perceptions when they inform agency. When it is unreflectively enacted in a development space, it informs the prevalent understanding of front end development opportunities. The elements are not well-defined and the final understanding of these elements and the impact they may have on the development opportunities essentially lies with the individual developers and the enactments.

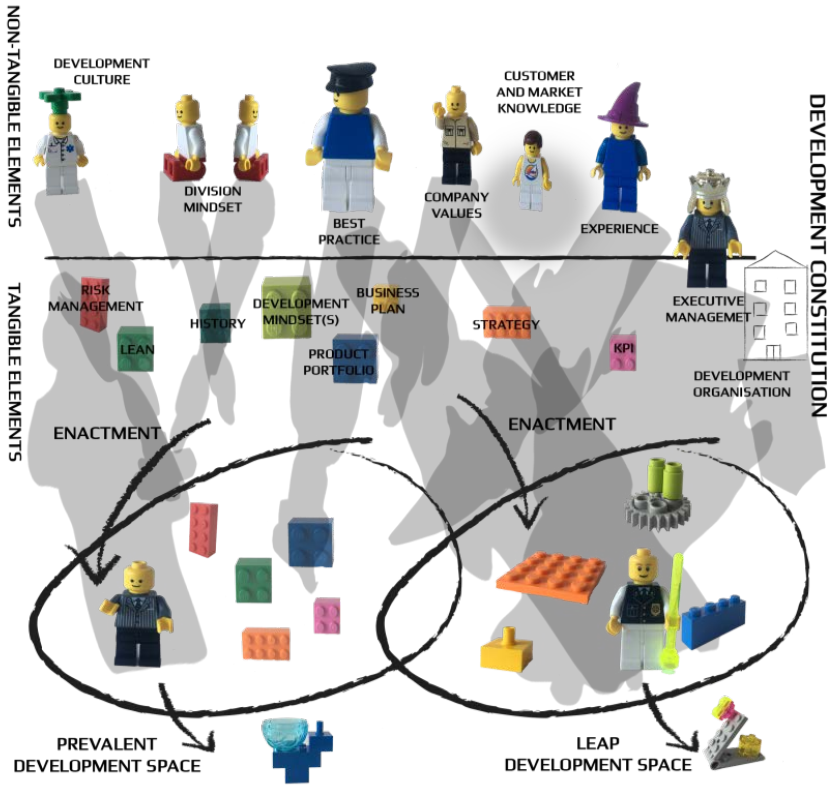

Figure 23: Development constitution. The different elements embedded in the development constitution are perceived differently, and thus affect the development opportunities differently. In the prevalent development space the elements of the constitution are implicitly enacted sustaining the perception of the given elements. In the Leap development space the elements are challenged and are given alternative meaning. E.g. in this case strategy is still strategy, but a different one.

It is easy to say that the case probably does not show an exact picture of the perception of the constitution, and I will not claim that it does. However, this will be beside the point, as the point is that there are different interpretations of the development constitution and thereby different enactments, and thus multiple development opportunities.

THE CONSTITUTING ELEMENTS

The explicit elements in the development constitution have a clear reference line in the sense that they are well defined, tangible and accessible to all employees. In one way or another, these explicit elements are of such a character that they need to be included when constructing development opportunities. This also entails ignoring them, but it will then also have an impact on the development possibilities. In this relation, it can be perceived as an obligatory passage point when staging (constructing) the development space. I recognize that each of the entities that I am about to elaborate and define is a result of a construction of actors giving it these characteristics just as the soil samples in the Buena vista case (Latour, 1999b). However, I will, for the sake of the point that I am trying to make, elaborate on the stability that each of the entities holds in relation to a perception of agency.

Development organization – The different divisions hold different responsibilities in regard to pursuing the same grand picture of fulfilling the strategic goals of the company. This division of the development makes it distinct that there are, and should be, different types of development activities. There are, however, also several agendas that are not related to a specific division that need to be fulfilled throughout a process.

The development model – it holds the official process for development throughout the entire organization. It is defined from the novel idea until market launch. Its sole official purpose is to provide support to the development process by making available checklists at the different gates. The gates are designed to focus the development and progressively make it market-ready. The development model does not have phases per se, and the time spent in between gates is for example, referred to as phase G1-G2, there are no recipes for how development should look like, or what tools, methods or processes should be applied.

Key Performance indicators (KPI) – is a performance index. There are KPIs associated with divisions and on an individual level. However, not all

employees are evaluated on the basis of defined KPIs. The KPIs are, in most instances, affiliated with the gate structures of the development model.

Strategy – is in relation to development as an indicator for which (type) of market to pursue and thereby the goals for the development outcome. Strategy should be guiding the divisions into taking the right decisions in relation to which way to go.

Product portfolio – In development, there is a focus on developing entirely new products or renewing existing ones by an upgrade, an add-on or facelift. It can be necessary to keep the portfolio up to date in relation to potential competition or a technological possibility.

The history of the company – plays an important role as the design is perceived as a trademark and a perceived understanding that it carries certain anticipatory characteristics amongst customers. The company prides itself as being a frontrunner within the technological possibilities, which was the case when the company was founded. Furthermore, there exist a room in the basement that is referred to as the chamber of failed projects, which displays all the projects that have been shut down.

Lean - The company had, at the time of the field study, just been through a 'leaning' process of the development organization and the focus throughout was on how processes could be more effective. There was an in-house consultant who facilitated kaizen workshops and implemented different lean tools and whiteboards to be present in the different divisions.

Risk management – in relation to the lean process, handling the risks throughout the development process was in focus. The gates had a focus on making sure a project would not progress if it carried too much risk (how this was defined was not explicit). The reasoning behind this is that it becomes more costly the longer the project progresses in the development model. Therefore, the potential risks need to be identified and handled early on.

Business Plan – For each project there has to be a business plan. The business potential for the project needs to be a factor of ten, and the initial business plan is drawn up at the beginning of the project and is the majority of the gate passing at G1.

Development mindset – There is an official distinction for what the development mindset and approach should be in the two divisions: the explorative and exploitative.

The implicit elements in the development constitution have no clear reference line or are defined in one specific way. They are, in a sense, phenomena that all employees relate to one way or another and thereby apply to daily work and development practices. All of these elements also serve as an obligatory passage point even though many of them will never be explicitly addressed.

Development culture – Covers the phenomenon of how, within the company, there is a certain way development comes about. It relates to the perception that there are certain norms that go into how to do development. These certain habits and routines automatically inform the development opportunities without taking explicit notice of this.

Explorative and exploitative development mindset – The perception of what the different mindsets entail, what makes explorative development explorative, in which areas can the development be explorative, and thereby where can the innovation be found: In the technical aspects, in the business plan, in the applicability of a solution to new or alternative market.

Best practice – The perception of how it was done best the last time in relation to certain goals (e.g. passing gates).

Company values – Where the company is trying to position itself and how it is going there. This will influence how a product is evaluated throughout the process as a means for figuring out how it fits into the portfolio.

Knowledge of customers and market – As the company has worked with the same market(s) over some years now; there is a stereotypical perception of how these customers act and what they want. It can be difficult to change this perception, and it is often self-reinforcing, as it is carried through project after project. Furthermore, there are different layers of users, as the local sales representatives are often also perceived as a sort of customer, as they need to be convinced of the possibilities in a new product in order to successfully sell it to the end users. Furthermore, the service units (those servicing and making repairs) in the company represent a great percentage of the total revenue, and they too need to be compliant with the new possibilities in a product in order for it to be a success. To juggle the different and not necessarily always aligned opinions toward new products leaves the translation of various needs into product specification to the specific employee.

Working experience – As it should, experience informs the perception of what is possible to develop in the context of the company, and previous experiences is, in this way, brought forth in new projects.

If figure 23 represents the development constitution in its generic form for this company, then it is easy to see that this type of constitution does not entail do's and dont's as embedded in a document. It represents multiple understandings of the constituting elements that, in ANT terminology, serve as obligatory passage points resulting in different development possibilities as the construction of agency is multiple.

The development constitution represents a series of actors given agency in different perspectives. Depending on the task and goal at hand, the strategic mobilization of certain aspects, and thus certain agency, will allow an actor collective to span and configure a development space in a certain way. In this instance, it is the passing of the development constitution as an obligatory passage point that constructs the agency. When this agency is staged in the development space, it will configure the development opportunities of the development space, hence influencing the development opportunities.

By introducing the development constitution as a notion, I hope that it will allow for a different discussion of the possibilities in front end. What I hope is that the notion of development constitution can inform a different terminology that will allow us to discuss and therefore understand front end in new ways. The development constitution is interesting because it is powerful as it actively takes part in understanding the actions of actors. For some, it represents ensuring the allocation of resources, for some it dictates restrictions for the development, but for others it can be enacted as the powerful actor collective to allow for new possibilities, including the ambiguity that is characteristic for front end activities.

In the next paragraph, I will introduce enactment as a notion in relation to unfolding the multiple development possibilities that the development constitution predisposes. Enactment should, in this relation, be seen as complementary to the development constitution as enactment is what makes the development constitution perform.

ENACTMENT

Enactment is a notion used by Karl Weick as an essential aid to understand his sensemaking conception (1979, 1995), which he has been unfolding and

writing about for over 30 years. Sensemaking revolves around how individuals make sense of an organization and how they, by action, actively take part in shaping the organization by enacting thus sensemaking. Sensemaking, in the sense of Weick, revolves around understanding how employees make sense of organizations, and it is, in this relation, revolved around the psychology and what makes people do and act as they do. Enactment has strong ties to the psychology as a way of explaining and understanding the incentive structure for acting. Enactment is, in the sense of Karl Weick, to be understood as taking place in an organizational setting. This is not to explain and understand front end per se, but rather in relation to understanding why and how different organizationally related issues are present and handled. Sensemaking, and thus enactment, can be either explicit or implicit, and I will further elaborate on enactment as a strategic conception that is applied in enabling the front end in the case company. I will elaborate how enactment in relation to enabling front end is about strategic making actors *do,* by utilizing the agency of certain actors or entities in relation to actor collectives that will entail a certain behavior or performance. Or as Weick (2009:37) describes it: "Enacting involves shaping the world".

When enacted, the development constitution, or parts thereof, provide a grounds for justification of the decisions going into the development process, much like the conception of the unwritten constitution in a society (Grey, 1978). It is not a matter of enacting all of the elements equally, but rather utilizing the elements that will best serve the cause and agenda. I have described the elements as being obligatory passage points (Callon, 1986), something that influences all actor networks, and, in that sense, they are also recognized by all actors, this makes them legitimate in the sense of an argumentation or justification of choices. Just as the judges and the lawyers have translated what the constitution means for society, it is my perception that a majority of the employees in the company have developed a normative translation of the elements embedded in the constitution, thus informing how to perform development in the front end. In order to cater for, and make the perception of the rules into development actions, the development constitution is enacted to perform in a certain way. I will argue that, through enactment, the development opportunities are a result of strategically interpreting the development constitution and addressing new development goals, thus allowing for multiple development paths as a result of enacting and the construction of agency.

March (1994) describes that a lot of the development that occurs is on behalf of routines, scripted and random as oppose to explicit and strategical.

Routine, scripted and random are interesting, as they indicate that there are different types of enactments. In an ANT perspective, the exact label of whether it is routine or random is not too important, as the ANT perspective will study the construction of the actors and how actors are enrolled into the network, by whom and when, and this will result in enactment leading to development of different characteristics.

Enactment is a notion and terminology for what makes actors do, and it aligns well with the ANT understanding of action and making actors perform. Enactment creates performance based on the agency of actors (human or non-human), allowing them to perform and thereby influence their surroundings. As there are endless opportunities for enactment depending on the actors in play, it will be possible, desirable and inevitable that there are multiple versions of how agency informs and configures for multiple versions of front end performances. The possibility for grasping multiple enactments, and therefore multiple development opportunities, is one of the main points provided by the ANT ontology. In relation to my review of other studies of front end, this is precisely one of the perspectives that I have identified as lacking in order to understand the difficulties and opportunities for enabling front end. There is no one perspective that is more correct than others, and one perspective cannot be isolated as the perspectives dispose various meanings across the different perspectives. The ambiguity present in the front end is a basis for the multiple enactments that allow for the complexity that is present in the front end, and probably needs to be. Enactment describes the different possibilities for staging the front end. In the case, both front end projects in CD and the Leap project are enacted to perform as they do. They draw on many of the same elements from the constitution. However, agency is constructed differently and therefore the actor collective is able to act differently.

When turning to the applicability of enactment in relation to enabling the front end, it further helps to describe the in situ perspective of front end rather than understanding what has been done retrospectively. I stress this once again as it is important to point out the action of enactment and its alignment with strategic decisions for enabling a development path by enactment. In this perspective, enactment can serve as terminology for how to align the *right argument* in order to obtain a specific something.

Garud and Kanøe (2001:11), describe a very central point in the perception of success or failure for path creators that is in close alignment with what is also at stake when looking at the enactment possibilities of alternative development

possibilities (path creations). "(…) the embeddedness of action generates several challenges for entrepreneurs. Not only do they have to dissemble from embedding structures, they also have to overcome the resistance they may generate in the process. Moreover, they have to mobilize elements of the network in which they are embedded in order to further their efforts even while preventing the process from spinning out of control. (…)". If this is transferred into enactment strategies, it is evident that not all employees in development can embrace the role of successfully enacting the development constitution into performing differently and thus creating a different path of development to cater for other opportunities. The embeddedness makes it intangible and therefore only accessible for some; the intrepreneur who can see the possibilities for change but within the structures of the company and by creating agency that can be enacted into serving these alternative agendas. The successful intrepreneur achieves this by excessively creating alternative actor networks and the agency of these will challenge the perception of the constitution of development where needed, and apply and align with the constitution of development when practical. The constitution is not static, it is maintained by the enactments of the different actor collectives engaging with the agency that the elements provide in the respective actor networks. The constitution is therefore changing in accordance to previous projects, and will, at times, be challenged out of the ordinary with initiatives such as Leap. However, it is still important, as it, in the case, shows that understanding and utilizing the constitution of development in alternative means is what has made Leap successful so far.

I will occasionally refer to the constitution of development as a whole, and sometimes point to specific elements that have been given agency in order to perform. When referring to the development constitution as a whole, it is because there are several elements embedded in the development constitution that are informing a certain point that I am trying to propose. The difficulties in explicating the development constitution are the many layers and levels that exist.

THE PREVALENT FRONT END DEVELOPMENT SPACE

"(…) there is not some kind of monolithic, singular, fixed environment that exists detached from and external to these people. (…) They act, and in doing so create the material that becomes the constraints and opportunities they face" (Weick, 1995:31). Weick describes the mechanisms for how experience becomes by (en)acting; the actors will mobilize other individuals or things that

determine which actions are possible and how. When determining how to enact, it influences which options are possible. Weick(1995) explains one of the mechanisms for the navigating of possibilities is that the actors need to act with a meaningful purpose. Knowing the potential outcome will thus guide to how the enactment is performed. This leads to the understanding of why and how a sort of development routine is manifested in the basis of withholding agency to the development constitution. It is sustained in terms of repeatedly enactments making the actors and embedded elements of the development constitution hold the same agency in different development spaces, thus reinforcing the agency. One quote to which Weick often refers is his resume of what sensemaking revolves around: "How can I know what I think until I see what I say" (Weick, 1979:133). This captures an explanation of why certain enactments are chosen and performed and why it can be difficult to enact an alternative experience, as you, in that situation, do not know what you say until you say it. On the contrary, if you enact the same agency of the development constitution as in previous projects, then you know what you say and therefore also how to think it.

In making sense of the organization and, in this, the development opportunities, the actors try to make sense of what has already been done. This making sense of the past will result in structures and rules that support the retention of what has just been made sense of (Weick, 1995). The point here is that previous experiences are easier to grasp, as the outcome is tangible and known, and enacting these experiences seems more comfortable. (Murphy, 2015) explains this retention of routines in relation to how individuals make sense of situations: the individual acts on the basis of the meaning that they are trying to create. Therefore, if a developer is trying to create sense of why a previous project was a success or perhaps a failure, that individual will then try to enact the development opportunities in reflection of previous encounters and adapt and adjust accordingly in their actions.

Enactment is a notion that is grounded in an organizational understanding (Murphy, 2015). Members of an organization cannot stand out as an individual or member of the organization when studying why certain enactments occur and, for instance, new (alternative) development paths are created. Working in an organization reflects a person's products, services and activities, because they need to relate to the organization and all its elements at all times, which entails embracing it or having to distance it. Either way, the organization will influence the possibilities when enacted; therefore, it becomes interesting how enactment can become strategically beneficial by incorporating the perception of already known organizational rules in new

means. The organizational setting provides a perception of various organizationally determined aspects such as strategy, these perceptions of the present agency (of, for instance, strategy or development process) are determining what is enacted and how. Murphy (2015) describes this as a constituting process where the actors in play enact in bias based on what they think is the right perception and with the best chance of obtaining the recognition that they want. The actors then act in relation to where they think the best possibility for success lies. In relation to front end development, this can be exemplified in bonuses for passing gates.

In this regard, Weick observes: "In working in organizations decisions are made either in the presence of others or with the knowledge that they will have to be implemented, or understood, or approved by others. The set of considerations called into relevance on any decision-making occasion has therefore to be one shared with others or acceptable to them" (Weick, 1995:39). Weick illustrates well what is at stake when the developers and the project managers choose an enactment strategy. The developer or manager enacts according to how they perceive the potential receiver will evaluate what they present. The actors co-create, by enactment, the experience. They enact the meaning they want to create in their surroundings (Murphy, 2015:22). In Weick's sensemaking it is important to point out that it is a process, and that it thereby is radical different from that of interpreting things. Making sense and enacting (new) meaning, shows as a process when the sense maker actively takes part in making sense by strategically enrolling and mobilizing actors. This is different from interpreting that in nature is more retrospective and relates to understanding (in alternative ways) what already is, and not enabling.

ENACTMENT STRATEGIES FOR CONCEPT DEVELOPMENT

The development model is applied in many forms as a means for enabling front end. In theory, the model is not rigid, and is to be perceived as a support tool, and neither as informing the development in a certain way nor restricting the possibilities. However, the gate systems are in focus, as this becomes the measurable. In CD the development process provides templates for what the concept report should include, and a checklist of focus points for the concept project.

Another example from the case is the notion of the gates G-1 and the potential G-2. These gates were constructed outside the official development model, yet

still aligned with it in terms of labelling gates in relation to the model. These reconstructed G – (minus) gates are products of CD, and are an answer and reaction to the difficulties in bringing forth front end projects with a radical dimension within the development model as it is. However, it is still important and fruitful to be aligned with the development model, as it does provide some necessary resources that are essential for progress. The resources are difficult to access if it is not recognized as a project that is official and facilitated through the development model and thereby has a pipeline of potential.

RATIONALIZING BI PERFORMANCE

To refresh some of the conditions for how the BI division perceives development. BI is indeed an embedded actor which reproduces the previous practices for development. They hold a division KPI to pass five projects on to the exploitation division. That means that they need five projects to pass through the G2 gate and therefore, 5+ projects need to be eligible to pass in order to ensure that they will reach the goal. Passing the gate is not as straightforward as the development model may lead it to be. The development model has generic checklists for what a project needs to include and a template for how to describe the concepts proposed for passing. In many ways, the projects will, in this sense, be aligned, as the goal is to pass the projects on, and not evaluated specifically on the innovation level of the proposed concept. The uncertainties embedded in a concept proposal are measured in relation to the technology and how well thought of it is. Furthermore, the incentive of bonuses and KPIs that represent the existing practices and structures makes it an easy choice to follow the already known development path. The experience with previous projects and how review board meetings have played out also feeds into the perception of what is actually at stake when preparing for passing a gate. In the case study, there are indications that the type of development path chosen in BI relates closely with the perception of how previous gate passings have been enacted. This can be seen as the management of BI does reflect, when asked, why Leap is not initiated in BI, or why BI has not previous been able to create development paths that support concept development with a more radical perspective. It is easier to stay within the dominant perception of the constitution of development and enact on the basis of the understanding of how it was done yesterday. There are many elements at stake in established mature development organizations and the incentives for, and evaluations of; good performances are deeply embedded in the understanding of development possibilities. It takes a certain type of individual to look past and navigate through the existing practices informed

by the dominant perception of the constitution of development. Furthermore, it requires management support at some level, as it will challenge the existing structures and perception of the development constitution. Path creation is therefore not to be mistaken with going rogue; hence the previous distinction between entrepreneurs and intrepreneurs.

ALTERNATIVE ENACTMENT

In figure 23 from previous section, the development constitution is portrayed with examples of how the different elements are perceived by different actors and what value is ascribed to the elements at the time of the field study. The figure shows how there are different interpretations of how the elements are included in the construction of agency, and thus different enactment possibilities of the development constitution. In this instance, I will focus on the enabling of front end as seen in the case, and will go into further detail of the translation of the development constitution and the enactments enabling Leap as a front end initiative. To support the understanding of the strategic enactment strategies of the Leap project, I will put it into the perspective of the just described enactment taking place in BI and CD. By explicating the different enactment strategies, I will show the different development opportunities that appear when enacting differently.

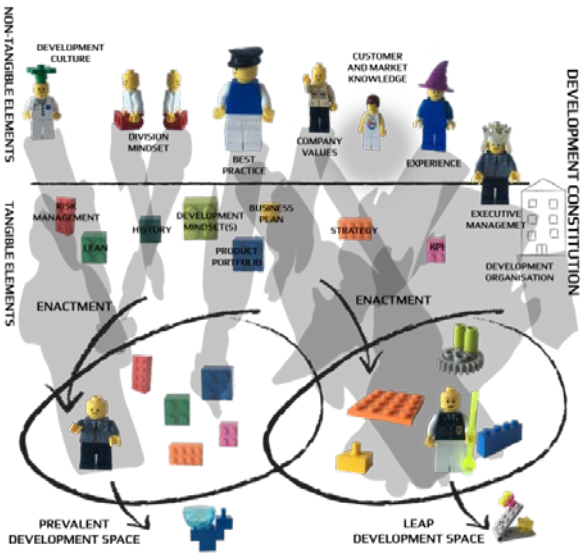

Figure 23: Development constitution. The enactment possibilities.

ENACTMENT STRATEGIES FOR LEAP

To briefly recap on the incentive for the Leap project, there was a need and demand from the PI division for concept projects with greater innovation potential. There was a developer in PI who had a proven track record of producing innovative conceptual work, another developer with a technologically good idea that needed maturing, and a business developer who saw great potential in a market. This resulted in the initiative that is referred to as Leap. The Leap project manager built this figure in the Lego Serious Play workshop when he was asked about the barriers for performing front end development of a more radical nature.

Figure 24: Barriers for front end.

The story for the figure is that he experienced too little ambition in regard to placing the bar for innovation. Those responsible for identifying new radical development opportunities with a great business potential would constantly look at the same thing, and therefore not be able to come up with new material for new front end projects except for those easily fitting into the product portfolio of next generation or facelift projects. As a response to this perceived narrow-minded approach to front end, Leap was initiated. Making sense of something will always have a person at the front (Weick, 1995). The Leap project manager can only enact an alternative front end because of the mobilization of a constructed actor network where he is the key actor and acts as the spokesperson of a new agenda. The key actor will have to acknowledge the different elements in the development constitution, as they serve as obligatory passage points for staging a front end development space with front end development opportunities. This is, at least, a strategic move that a key actor can take, as it will enact alignment with the organization, and in this sense not stand out, in many instances, on a superficial level, thereby not making too much noise throughout the rest of the organization as described by Garud and Karnøe (2010). By re-enacting the different elements in the development constitution the actor collective represented in Leap will form different agency through those strategically selected entities, inducing

different performances of the development possibilities in regard to the staged development space.

The new common goal and development agenda is to practice radical innovation, pursuing new to the world technology and entering new (to the company) markets.

One enactment strategy for the Leap project is that many of the embedded elements captured in the development constitution are re-evaluated by making them explicit and tangible. The enactment strategy then consists of identifying which elements - hereunder actors and the embedded agency - are present and influencing the front end. Secondly, the enactment strategy focuses on changing or constructing new actors by changing the agency into staging for the explicitly chosen purpose. In this case, this is showcased by how Leap gets away with working on a project idea that does not fit into the predefined process for good development behavior, but still manages to exist.

Leap enacts the development constitution by aligning itself with the organization in utilizing official organizational structures such as the development model. In this way, it contributes to the goals of other front end initiatives, and enters the same actor collective working toward that same goal. However, the incentive for doing so is different, but the seemingly identical agenda puts a damper on a potential of resistance from other entities in the organization. However, even though aligning with the development model, as I have previously described, this enactment strategy allows Leap to communicate with the rest of the organization on the terms of the organization. In order to circumvent the best practice of the development model utilized in focusing on taking out the risks in the project as a means for passing gates, the Leap manager has taken another strategic enactment strategy, namely establishing a direct communication line with the executive management and management of PI and, through these channels, arguing the potential of the concept idea despite the greater risk and level of ambiguity it carries. This direct communication with actors, who by mandate can overrule best practice as embedded in the development constitution, enacts the possibility to stage and enable front end in alternative means. However it also entails more resistance as it is experienced that Leap are given preferential treatment.

Enactment strategies are also shown in how the development mindset was staged in the Leap project. It is explicitly addressed as being something other than that practiced elsewhere in the organization. This enactment strategy

gives the employees a sense of belonging to a social practice but also induces a reflection for the involved parties on what it is that informs how development is practiced, and what is needed in order to enable it. The enactment strategy encourages a focus on how to perceive the outcome and explicate the potential of failure, but also how it should not be seen as a failure, and how to then utilize it to progress and advance the project.

Another way Leap embraces the potential resistance is to informally inform and communicate the idea and the potential to the possible developers taking over after the passing of a G2 gate. The enactment strategy is to expand and invite colleagues into the project network, making the actor collective stronger by enrolling strategically important actors into it. Leap does this by, for instance, inviting them to join the morning meetings to keep them in the loop and get them interested in the potential. At one meeting where I was observing, three of the project members were explicitly discussing how and who should initiate the contact with different key actors throughout the organization. They deliberately tried to create a pull from the division taking over the concept after the G2 gate, as it has historically been a burning platform in regard to a conceptual project's success in PI. Leap handles and enacts the potential difficulties upfront by staging the emergence of radical ideas as forming strong actor networks.

To argue the existence of such a project as Leap, what key actors have done very smartly is to enact the company strategy to strengthen their cause. They have, at the beginning of the project, developed what they referred to as the innovation intents. These are embedded in the official company strategy and are accessible to all. The innovation intents describe potential new markets and technologies that ought to be explored as they hold great potential. These intents (of course) support the work being done in Leap, making it compliant with, and not challenging, strategy. When asked, the manager of CD recognizes the innovation intents, but does not know exactly what it is they entail. In theory, CD could also easily pursue the development goals and agendas argued in the innovation intents.

Furthermore, Leap is, from the perspective of CD, an easy development task to facilitate, as Leap seems to be operating with considerably more resources for front end of development than prevalent CD conceptual projects. However, I remember how I, during my field study, received an e-mail from the BI management stating that there was quite a substantial amount left on the division balance to be used on development for the current year encouraging developers to spent the money on ideas they might have, or else the money

would be gone. It is not a farfetched conclusion, but it seems that there are other aspects that are lacking than just providing resources when staging a front end development space supporting radical front end innovation within the organizational structures and its embedded development constitution.

The Leap manager makes sense of the organization and its possibilities in a different way by enacting the development constitution to perform differently. However, the enactment is refined by still being seemingly aligned with that practiced and enacted by most. This gives the Leap project an advantage in regard to being challenged by other members of the organization. The strategic enactment in this instance then lies with the fact that Leap enacts a new development possibility by referencing the same terminology as the other projects. The Leap projects buy into the parlance of the development model, even though the actions do not reflect the actions of many other projects. By being able to communicate to the rest of the organization which phase the projects are in thus allows the receipt of resources and the communication of progress to management.

I have, in this chapter, accounted for how front end is enabled. The development constitution is a conception understood in ANT terms as an obligatory passage point. The development constitution is constantly negotiated amongst the actors engaging with its composition, and will, for that reason, change over time as new perceptions are stabilized in actor networks. The enabling is multiple and defined by the strategy for enacting the development constitution that is applied by the actors in focus. The strategy for enactment is aligned with the development focus and scope, which, in a mature development organization, is multiple and influenced by the many layers within the organization. However, front end enabled by strategically enacting the development constitution to stage a development space that supports the development agenda is in focus.

AN ALTERNATIVE PERSPECTIVE ON FRONT END

Studying the front end with ANT ontology has led me to identify and elaborate a development constitution that can be enacted in multiple ways by changing agency by constructing new actor collectives. It is not the development constitution as conception that is enacted, but strategically selected elements thereof. However, agency to perform and influence lies in the embeddedness of a development constitution, as it, in the minds of the organizationally anchored actors, serves as an obligatory passage point for staging the development space.

The constitution is fluid and continually negotiated, and is thus configured as the development opportunities are enacted and new knowledge emerges (likely on the basis of recent project activities). The multiplicity and time dimension of the development constitution is essential to emphasize. As shown, by exemplifying different ways in which the development constitution can be enacted, I have shown how there are multiple interpretation of its elements referring to the same terminology, and how these interpretations again inform the concept. Furthermore, is it important to point out that the development constitution is not a predefined conception where roles have been defined, and where actors take their place and enact according to a script. Instead, the development constitution is present because actors enact it to be. Much like the metaphor of the cookbook in the beginning of this thesis, the development constitution is something that allows employees to communicate, to navigate and, to some extent, provide a false perspective of certainty as it is perceived by many as a one-way enactment possibility. However, what goes into informing the development is a different story.

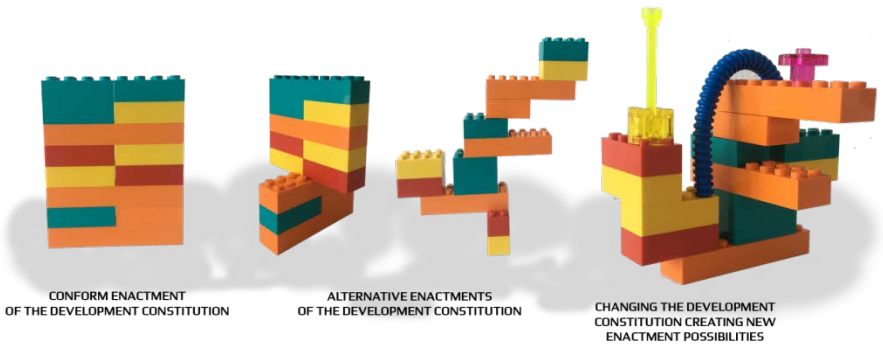

Figure 25: Configuring the development constitution. The development constitution is time sensitive, and will change accordingly to being enacted. The building blocks may be the same, but the possibilities different. However changing the development constitution by introducing new elements can lead to entirely different development opportunities.

The retention and recognition of multiple perceptions of how front end development should and could occur can, in practice, be difficult to handle as an organization, but it is the embracing of the complexity and possibility for ambiguity that creates a basis for front end development. The conception of the development constitution is meant as a sensitizing concept and thus a terminology for understanding what needs to be included in pursuing facilitation of front end in embracing the multiple strategic enactment

strategies supporting different goals and agendas. Indeed, many theoretical models exacerbate the challenges by suggesting simplifications of inherently complex problems. I will embrace and include this complex understanding of innovation in the front end, because when studied, my informants embedded in the front end embraced that complexity and ambiguity being present in their performance of the front end possibilities. In the case, I have shown how explorative and exploitative innovation is quite closely aligned and interdependent. The development constitution is therefore a direct response to what I understand as an overly simple understanding of the problems with front end of innovation, where deploying linear normative models risks dampening the very generative forces that are required to sustain front end of innovation. Instead, practitioners must explore and experiment with arrangements that harness complexity as a generative force when conducting explorative innovation (Garud et al. 2013).

I now offer a final point and disclaimer of what the constitution of development is not. The development constitution is dynamic, and even though constitution associates with dictations of behavior, the constitution of development does not. It constitutes in the sense that it is enacted by the actors in the company into meaning in regard to development possibilities. The constitution of development does not outline a "how to" or rulebook, as this is not feasible and desirable to implement due to the nature of front end development. Neither will I claim that the concept of a development constitution is a recipe for how the front end should occur, as it is not a full plug and play solution ready to hit middle management. Instead, it will provide a terminology and understanding that will aid in the discussion of how the inevitable experience of problems of front end can be handled in progression toward the development goals. The front end is in front of something and this premise has, throughout the case, been shown to be important. In other words, I will focus on front end as it is what I have studied, but it is linked to the remaining part of the development organization, which is then also addressed.

"In path dependence the emergence of novelty is serendipitous. Events that set paths rolling can only be known post-hoc. Consequently, the role of agency is relegated to one of entrepreneurs driving forward while watching the rear view mirror. Stated differently, although path dependence focuses on a sequence of specific events, it does not have an explicated theory of agency". (Garud and Karnøe, 2010:7). This discussion of agency is interesting when trying to understand how prospective front end can be understood and enabled through the strategic work of enactments with a perception that there

exists something that insists on certain action(s), latent or explicit. In my argumentation of the constitution of development, I have argued that a constitution of development is not passively incorporated and only understood post-hoc by identifying contingent events in relation to front end possibilities as described by Vergne and Durand (2010) in their definition of path dependence. In the case study, I have shown how specific actors are able to enact the front end possibilities in alternative ways, playing and referring to the well-established practices and understandings (development constitution elements). This alternative enactment allows a project or project members to construct the development path for their development tasks and activities on an alternative path that can accommodate new and more radical ideas to be brought forth.

Another point where the development constitution as a concept has proven to be dynamic and not only facilitating an understanding post-hoc is the possibilities for having multiple choices of development opportunities as they are enacted strategically. In contrast to the path dependence that seems to focus on the perception of a one-way path that will be taken regardless of the people involved (with the exception of the perception of the exogenous shock), this multisided perception of development opportunities is very interesting when trying to understand why development occurs as it does. Many of these different perceptions of the development possibilities are not explicitly known and enacted, but are applied as though they represented the same perspective. This multiplicity gives, on the one hand, the possibility to communicate via a (seemingly) common platform, but on the other, also a fake comfort that all is in the same boat, even though there are very different readings into what, for instance, the project goals represent, for whom, and why.

The case shows that the perception and the enactment of constituting elements will show in different development opportunities. The dominant enactment strategy of the development constitution enables a certain type of development space to be staged. In the case company, this development is characterized by being very closely aligned with exploitative development representing the leaning of the development processes and the existing markets, which is also practiced by PI. Furthermore, the development model and the incorporated incentive structures are enacted to support the exploitative development strategy. When deviating from this development path, the case shows that a key aspect is that the development space is staged by the seemingly same actors as in other projects, but with a change in agency. The key point is to appear aligned with the remaining and dominant parts of

the organization, and only challenge when there are obstacles that cannot be overcome by re-enacting the perceived development constitution. In the case, this can be exemplified by the development of strategically important innovation intents that become part of the official strategy or by enforcing a different development mindset in the project group. Instead of stepping out of bounds and pursuing innovation opportunities that were not argued for in the strategic manifest, the enabling of front end is reached by enacting a change in the development constitution. In the case, it is exemplified by the innovation intents, which, in practice, only the Leap project stages in their development space.

The development constitution is perceived as a set of rules and best practices that frame for a certain type of development to occur. In contrast to the path dependence theory, the development constitution is fluid and constantly up for discussion if pursued (as the nature of ANT). It can be enacted differently and thereby alternative development paths will emerge. There are no exogenous shocks per se that need to happen in order to generate change as described and accounted for in the path dependence theory (e.g. Vergne and Durand(2010), Garud et al. (2010)), but rather a change in enactment strategies of the development constitution that can change agency of actors. This is the exact point. The Leap project is not a rogue project that has autonomously created their own set of rules; rather they have applied the same elements from the perceived constitution, but have changed the possible outcome by enacting it differently, or allowing for new elements to be officially placed as a constituting element, an element that supports a different development agenda.

Basically, the development constitution influences performances because there is a perception that it can. This is not an explicit understanding of its existence, but rather an implicit use of the constituting elements. In recent work by Brønnum and Clausen (2015b), I have discussed how this constitution materializes itself in a mature organization. In this paper, I have focused on the implicit and explicit elements of such a proposed constitution of development. The constitution is not written down by certain individuals, nor does it consist of a specific type of element. In isolation, you cannot practice the development constitution wrongly, but you can enact the development constitution wrongly depending on the purpose for enacting and the agenda and the goals for the project at hand.

Creating alternative paths takes skills, and Garud and Kanøe (2010) refer to the individual carrying out the path creation as an entrepreneur. I will not

discuss whether this specific label is applicable, as I think this is an entirely different discussion. I will however, focus on the enactment of the development constitution as a skill-set for enabling front end activities. I do find the notion of intrepreneur (entrepreneurs operating within an organization) to be more suited for understanding the game of the front end in a mature development organization. As the case shows, it is important to continually be aligned with the organization, which I see as different competencies compared to the entrepreneur being free to operate more autonomously. Path creation is difficult due to "(…) embedded actors continue reproducing existing practices because they may avoid new tests" (Weick, 1979:149). Alternatively, as described by Garud and Karnøe (2001:10) "The impulse to exploit what has already been created is so great that the impulse to explore and create new structures may reduce or disappear (March, 1991). For these reasons, an actor may not be able to develop the generative impulse that is required to set path creation processes in motion." In all, I think the argument is quite straightforward. It is easier to do what you have always done, it is more comfortable to do what you know and it is safer to do what is expected.

Legardeur (2010:260) has described that succeeding with radical innovative development in an organization can be difficult, as the new project will be judged and benchmarked against the existing processes and products supporting the exploitation. The terminology around the development constitution allows actors to construct and enact a different benchmark for success, thereby staging the development into other means avoiding the dominant perception of what development should entail.

One of the reasons why front end is experienced as difficult is well described in the following Schumpeter citation taken from Garud and Karnøe (2001), suggesting that: any system designed to be efficient at a point in time will not be efficient over a point in time. Garud and Karnøe (2001:6): "Experimentation requires "time" for new ideas to be refined and grow even as new institutional and market preference structures co-evolve." What is at stake here is that the known development model that most companies have makes it difficult to handle front end, as they focus on entirely different aspects such as effectiveness. Therefore, with reference to the paragraph on what front end is, it is important to embrace uncertainties and ambiguity in the front end process. This supports the need for alternative approaches to the front end in a mature development organization, as the front end cannot exist in the structures present. When trying to understand why radical front end is difficult, we need alternatives to understand the actual premises for how to

discuss the premises for enacting front end in an established mature development organization such as shown in the case study.

CHAPTER 7 – CONCLUDING

SUMMARIZING AND CONCLUDING

I will now take the final step, concluding and summing up the points made across the thesis and thus what I have contributed. I have, through an in-depth case study, shown how front end of innovation as a "phenomenon" is enabled in a mature development company. Throughout the thesis, I have shown how front end is difficult to handle and the processes difficult to understand. In my field research, I did not study how the normative innovation model or process was designed or how it was applied. I have challenged the normative understanding of front end and how it is enabled by studying the actors and their perspectives on front end. I did this by understanding their intents by investigating actions and the incentives for doing so. Through studying the construction of actors and agency in an ANT ontology and epistemology, I have been able to understand and describe how front end has, in real time, been enabled by strategic enactments of the development constitution. The focus changed from a normative perspective of how a generic front end could operate, to understanding the actors and their perception of the front end possibilities. I have shown how front end, on the premises and perspective of the actors, is multiple, and ambiguity considered as necessary and an asset.

In concluding the main research objectives, I will state the research questions again:

> *How is front end of innovation enabled in an established development company?*

by identifying and studying the construction of actors and how and why actions appear, the second research question was:

> *What characterizes the enactment(s) that enables front end?*

To answer the research questions, I will try and summarize the points made throughout the previous chapters and thus unfold and argue the contribution of this thesis.

REVIEWING THE LITERATURE

In my search for answers and to better understand the front end, I have read through literature which by its own definition, revolved around front end. The review focused on understanding how front end was perceived as a phenomenon that I later could unfold and investigate in a field research study. I have investigated three different perspectives that I saw as important in the discussion of front end: design engineering, innovation management and organizational theory, each of which contributes with a specific understanding of front end.

From the design engineering perspective, there is a focus on the construction of the product and what type of knowledge should go into informing the solution. This includes how this knowledge is produced in various models and methods. The innovation management perspective does not, however, elaborate the actual construction of the concept but rather places focus on the processes facilitating the innovation through to the next phase. In processing the innovation, there is a focus on the ability to measure the quality of the concept and the performance of the developers. The organizational perspective provided a focus on how the organization should be designed in order to support the explorative development that front end entail. This is achieved by proposing that the organizational development divisions are assembled on the basis of the project agenda, as opposed to structuring according to expert domains in separated divisions. The different front end perspectives overlap, as they loosely refer to the focus point related to the other perspectives. However, they do not recognize the complexities included and they continue elaborating on each of their perspectives, referring to others by referring to concepts as blackboxed entities. The literature review pointed to the absence of a perspective on the role of actors and the enablement of front end in mature companies. Further, the literature was characterized by singular perspectives lacking a multifaceted approach reflecting the different perspectives. The dominance of a normative description further made it difficult to relate theory to the actual practices of front end innovation. The lack of focus on actors made it difficult to grasp how front end should be perceived when it still did not work and was experienced as difficult. The three perspectives on front end that I studied in the literature all contributed to how front end should be perceived. However, the different singular understandings of front end presented in each of the three perspectives made it difficult to understand in a practical perspective, where all concepts and understandings were present equally and intertwined. The different normative and singular descriptions of front end all applied to the front end that I was studying. None of them accounted for front end in a

manner that I could relate to when asking how front end was enabled in a mature development organization. On this basis, I came to understand that front end is multiple in the sense that several ways of understanding front end co-exist, thus supporting several ways of discussing it. Instead of focusing on understanding the difficulties by enforcing the singular and normative perception of front end, I have change the perspective. I have, through my research, focused on understanding how actors enabled front end through strategic enactments of what I proposed to be the development constitution. In this perspective, I understand and describe front end of innovation based on the perspectives of the actors and their perception of front end, including their navigation through the innovation models, methods, processes and organizations. Accordingly, reviewing the literature made me understand that the perspective of the case study deviated from what has previously been described in front end of innovation literature by investigating real-time processes in the perspectives of actors.

AN IN-DEPTH CASE STUDY

The thesis contributes with a case study on how front end is enabled in multiple ways in a mature development organization. The empirical data is based on data collected in real time, understood in the sense that a front end project was ongoing while I conducted the field research. Consequently, the insights do not only rely on the memory of the informants and whether the project succeeded or failed. The empirical data portray strategies that were applied by the actors; some strategies were explicitly articulated, others were not. Common and of interest were the development opportunities that each of these strategic actions predisposed. I point to this fact as the story might have been quite different had I only conducted interviews with my informants after the project's completion. Here the focus could have been influenced by whether the project had succeeded or failed. The level of detail would have been different, as I would not have been able to observe many of the implicit strategic moves taking part in the enabling of front end.

I have used Actor Network Theory (ANT) as the foundation for my alternative perspective on front end. Through the principles of ANT and its focus on the construction of actors and agency I have presented an alternative perspective on how to understand front end, and thereby how to enable it. I have, through an in-depth case study, described the multiplicity of front end through the presentation of multiple enactments of the front end development opportunities. With my case study, I challenge the singularity and normative

description of front end that is seen in engineering design, innovation management and organizational perspectives. ANT has supported a description of front end from an actor perspective, allowing for multiplicity and thereby embracing the embedded ambiguity of front end.

I have studied front end by tracing and analyzing real life processes and, through engagement with the field, made sense of the actions and decisions discovered. The in-depth case study provides insights into how, and on the basis of what front end can be performed. By studying the real-time processes performed by the actors I have furthermore shown how the answer to *how front end is enabled* does not lie in the normative and singular understandings of models, processes and structures. This calls for a change in perception of front end as a multiple phenomenon where the construction of possibilities is the result of enactment strategies.

MULTIPLE ENACTMENTS

The premise of the field study is based on ANT and its focus on studying actors and their experience and understanding of the front end, and it is through the empirical data that I saw that different informants referred to the same elements or actors as influencing their performance. However, the role of elements and the reason for referring to these specific elements (or actors) differed among the actors. I propose the conception of a development constitution as a common reference to the elements referred to by the actors as influencing factors for performing front end. The development constitution is a constructed conception that forms the basis for what all actors need to consider in relation to enabling front end. The development constitution is given agency when it is enacted by the actors of front end and forming an actor collective pursuing a specific front end development agenda. Understanding the development constitution leads to understanding enactment strategies, which seems highly relevant for the actors when staging a development space that supports the explorative nature of front end.

Enabling front end is a contested field and there are many elements that influence the possibilities for the performance of front end development. There are many innovation conceptions and development intentions present in a mature development organization, some of which can result in counterintuitive initiatives, making the development constitution difficult to navigate, as the enactment may not be as straightforward as desired.

EXAMPLES OF FRONT END SPACES

The enactment strategies performed in order to enable certain front end agendas are multiple. In the case study, I have then described how there exists a more prevalent way of perceiving and enacting the development constitution which result and support the agenda of updating the portfolio. Furthermore, there is Leap, which challenges this prevalent perception of the development constitution by alternative enactment strategies. In this instance, Leap (re)configures the development constitution to enable front end differently, with alternative development opportunities. Front end is multiple and it shows in the many different possibilities for enactment of the development constitution.

In the case study, there are multiple examples of enactment strategies that all take part in staging a development space. In the Concept development division (CD) complying with the key performance indicators is an important factor to consider when understanding the development possibilities as perceived in this division. The performance of the division is, amongst other issues, evaluated on the basis of whether the concept projects pass the gates. This focus on passing gates induces a focus in the projects on complying with the evaluation criteria for a good concept. This is not evaluation criteria defined by the possibilities seen in the given concept, but rather evaluation criteria as perceived by the receivers of the concept project; the division for exploitation. Another enactment strategy is seen in the staging of an alternative to the front end development practiced in the organizationally anchored CD division. The actors enable a different front end space by developing and aligning innovation intents with the official strategy for R&D. In this instance, the actors have enacted the front end development opportunities by enabling themselves to argue for their concept idea in company terms by referring to pursuing strategic goals. The multiple enactment strategies are furthermore seen when the Chief operating officer (COO) also enacts the development constitution as he participates in reviewing which projects proceed through the gating system. The COO enables front end by autocratically allowing projects to proceed through a gate (or not), thus enacting the development constitution, as he then becomes an important actor when staging future front end development spaces. In this same instance, the COO is also enacted by the Leap manager. It is a deliberate choice from the Leap manager to have access to directly communicate with the COO, because he needs his support to pass the gates as he knows that the

Leap project carries too high a risk to proceed in the official evaluation gating system.

Front end is enabled in a mature development organization when the actors enact the development constitution in specific strategic ways to support their development agenda. To make the development constitution support the given development agenda, it needs to be enacted or challenged by introducing new elements, thus alternating the content of the development constitution and its potential agency. Enacting the constitution gives legitimacy to the project which, in a mature development organization, is important when seeking resources. The actor collectives expand to encompass all levels in the organization and are characterized by enacting the same agenda, but not necessarily with the same drive and purpose.

The development constitution is multiple, because it is interpreted and then enacted in multiple ways to stage different front end development opportunities. Front end is multiple, and I have, in the case, shown that there does not simply exist one way of doing front end. Instead, front end exists on various grounds, but the success depends on the strategic enactment of the development constitution. The elements of the development constitution are negotiated by all actors present in the organization, but it is not perceived, nor performed equally by them. The development constitution predisposes enactment strategies supporting a specific type of development as it is performed in the CD division. However, the development constitution does not dictate a certain behavior or enactment, thus leaving plenty of opportunity for applying alternative enactment strategies disposing for other front end development opportunities. Through understanding the enactment of the development constitution, it is possible to explain how the different front end activities are enabled and why some enactments are successful while others are not.

By introducing the development constitution as a concept, the elements and the agency that the development constitution holds become tangible and can serve as part of the terminology for discussions on how front end is enabled in one version or another. Consequently, the final conclusion and summing up of the answer to my research questions can be condensed into the following answer:

Front end is enabled by the construction of actors and actor collectives holding agency as a result of strategically enacting the development constitution. There is a prevalent enactment of the development constitution

that is performed in most projects, and constantly adding to and maintaining the strong perception of a specific best practice for front end. Every front end development opportunity is enacted, and by enacting the development constitution differently, thus challenging the prevalent understanding of front end possibilities; alternative front end development spaces can be staged. It is important for the success of any front end initiative that it enacts and thereby relates to the development constitution, either by enacting the dominant prevalent understanding or enacting an alternative understanding. The actors contribute to the perception of the development constitution by enacting it. The development constitution is dynamic and changes over time as new elements are introduced and enacted.

REFLECTING

Asking myself the question of how I would approach the writing of this PhD knowing what I know now is an interesting question, as a self-reflection as I would have loved to know what I know now at the beginning of my writing process. The great line of thought in this thesis was identified and materialized working with the empirical data. However, the nature of the specific understandings, and the argumentations were developed alongside writing the various paragraphs. This was, in some respects, interesting, but also frustrating, as the argument and the understanding of this multi-faceted front end emerged more clearly with each chapter I wrote. This, of course, interfered with what I had just written in another chapter. I think that I could have continued with this process for a long time, and it has been difficult for me to draw a line and conclude this thesis on the basis of the feeling that yet another iteration could make my argument and contribution more clear. Taking my background into consideration, I feel as though I have come a long way in my understanding of front end in both an academic and practical perspective, and for that journey I hope that I am recognized as contributing with an alternative perception of front end and its enabling possibilities.

Another question that appears when moving towards the end of this thesis is, of course, the prospects of the contributions. The points made across the thesis in regard to the existence of multiple enactment possibilities for front end would be interesting to explicitly study and elaborate upon. It would be interesting to study this in the given case company to detect how a change could be implemented when a conception such as the development constitution became explicit, and something to which the employees could relate. The development constitution as a conception exists because I have developed it based on my empirical data. However, as a conception, it is something that can be looked for and studied in any given company, which could be interesting in relation to better understand the different strategic enactment strategies present.

The conception of a development constitution is interesting and relevant to further explore as, in this thesis, I have only accounted and argued for its existence and how it affects the front end development opportunities in my case company. I, at least, have an interest in further exploring how the understanding of a development constitution can be part of a change management focus where the scope is to design and stage the front end possibilities in a mature development organization by complying with the actors. It would be interesting to see if some of the implicit and latent enactments enabling front end could be made tangible and applied actively in

the staging of front end. Furthermore, I hope that the thesis and the alternative perspective on a front end case it presents can contribute to a discussion of what constitutes front end. As indicated in the thesis, an improved performance within front end cannot, in this case be found by changing the processes and introducing new methods. Instead, it should be found in a solution space where front end is perceived as difficult and with ambiguity and where we, through this, recognize the need for understanding and making the dispositions embedded in the company structure and organization explicit in order to stage them in a development space configuring for the desired outcome.

REFERENCES

Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002). The key to Succes in Innovation Part I: The Art og Interessement. *International Journal of Innovation Management*, *6*(2), 187–206.

Andreasen, M. M. (Mogens M., Hansen, C. T., & Cash, P. (2015). *Conceptual design : interpretations, mindset and models*. Springer

Baer, M. (2012). Putting Creativity To Work : the Implementation of Creative Ideas in Organizations, *55*(5), 1102–1119.

Benner, M. J., & Tushman, M. L. (2003). *Exploitation, exploration, and process management: the productivity dilemma revisited*. Academy of Management Review, 28(2), 238–256.

Birkler, J. (2011). *Videnskabsteori : en grundbog* (8th ed.). Munksgaard Danmark.

Blumer, H. (1954). What is Wrong with Social Theory? *American Sociological Review*, *19*(1), 3–10.

Bowen, G. A. (2006). Grounded Theory and Sensitizing Concepts. *International Journal of Qualitative Methods*, *5*(3).

Brun, E., & Saetre, A. S. (2008). Ambiguity reduction in new product development projects. *International Journal of Innovation Management*, *12*(4), 573–596.

Bruun Jensen, C., Lauritsen, P., & Olesen, F. (2007). *Introduktion til STS : science, technology, society*. Hans Reitzel.

Brønnum, L. ;, & Clausen, C. (2013). Configuring the development space for conceptualization. *Proceedings of the 19th International Conference on Engineering Design (ICED13)*, *3*(3), 171–180.

Brønnum, L. ;, & Clausen, C. (2015a). Enabling Front End of Innovation in a Mature Development Company enabling front end of innovation in a mature development company. *Proceedings of the 20th International Conference on Engineering Design (ICED15*, *8149*, 235–244.

Brønnum, L., & Clausen, C. (2015). Enacting and Re-Enacting the Constitution of Development. I *XXVI ISPIM Conference: Shaping the Frontiers of Innovation Management* Lappeenranta University of Technology Press.

Callon, M. (1986). Some Elements Of A Sociology Of Translation:Domestication Of The Scallops And The Fishermen Of St

Brieuc Bay. In J. Law (Ed.), *Power, action and belief: a new sociology of knowledge?* (pp. 196–223). London: Routledge.

Callon, M. (1990). Techno-economic Networks and Irreversibility. *The Sociological Review*, *38*, 132–161.

Chakrabarti, A. K. (1974). The Role of Champion in Product Innovation. *California Management Review*, *17*(2), 58–62.

Chang, S.-L., Chen, C.-Y., & Wey, S.-C. (2007). Conceptualizing, assessing, and managing front-end fuzziness in innovation/NPD projects. *R&D Management*, *37*(5), 469–478.

Charmaz, K. (2003). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies for qualitative inquiry* (2nd ed., pp. 249-291). Thousand Oaks, CA: Sage.

Clausen, C., & Yoshinaka, Y. (2005). Sociotechnical Spaces: Guiding Politics, Staging Design. *International Journal of Technology and Human Interaction*, *1*(3), 44–59.

Clausen, C., & Yoshinaka, Y. (2007). Staging socio-technical spaces: translating across boundaries in design. *J. of Design Research*, *6*(1/2), 61–78.

Clausen, C., & Yoshinaka, Y. (2009). The role of devices in staging front end innovation. *Management*, 1–8.

Cooper, R. G. (1990). Stage-gate systems: A new tool for managing new products. *Business Horizons*, *33*(3), 44–54.

Czarniawska, B. (2014). *Social science research : from field to desk*. SAGE PublicationsSage CA: Los Angeles, CA.

Dorst, K., & Cross, N. (2001). Creativity in the design process: Co-evolution of problem-solution. *Design Studies*, *22*(5), 425–437.

Dougherty, D. (2008a). Bridging Social Constraint and Social Action to Design Organizations for Innovation. *Organization Studies*, *29*(3), 415–434.

Dougherty, D. (2008b) Managing the 'Unmanageables' of Sustained Product Innovation. *In Shane, S. (eds.) Handbook of Technology and Innovation Management* (pp. 173-194). Wiley

Fuglsang, L., Bitsch Olsen, P., & Rasborg, K. (2013). *Videnskabsteori i samfundsvidenskaberne : på tværs af fagkulturer og paradigmer* (3rd ed.). Frederiksberg: Samfundslitteratur.

Garud, R., & Karnøe, P. (2001). Path creation as a process of mindful deviation. In *Path dependence and creation* (p. 417). Taylor & Francis.

Garud, R., Kumaraswamy, A., & Karnøe, P. (2010). Path dependence or path creation? *Journal of Management Studies*, *47*(4), 760–774.

Garud, R., Tuertscher, P., & Van de Ven, A. H. (2013). Perspectives on Innovation Processes. *The Academy of Management Annals*, *7*(1), 775–819.

Geertz, C. (1973). The interpretation of cultures: Selected essays.

Grey, T. C. (1978). Origins of the Unwritten Constitution: Fundamental Law in American Revolutionary Thought. *Stanford Law Review*, *30*(5), 843–893.

Griffith, T. L., & Dougherty, D. J. (2001). Beyond socio-technical systems: introduction to the special issue. *Journal of Engineering and Technology Management*, *18*(3), 207–218.

Hansen, C. T., Andreasen, M. M., Boelskifte, P. (Ed.), & Sigurjonsson, J. B. (Ed.) (2002). The content and nature of a design concept. In *Proceedings NordDesign 2002* (pp. 101-110). Norwegian University of Science and Technology: Department of Machine Design and Materials Technology & Department of Product Design Engineering.

Hansen, C. T., & Andreasen, M. M. (2005). On the content of a product idea. In A. Samuel, & W. Lewis (Eds.), *Engineering design and the global economy: 15th International conference on engineering design* (pp. 182-183). Barton, ACT, Australia: Engineers Australia. (Design Society; No. 35).

Haque, B., & James-moore, M. (2004). Applying lean thinking to new product introduction. *Journal of Engineering Design*, *15*(1), 1–31.

Hvam, L., Mortensen, N. H., & Riis, J. (2006). *Produktkonfigurering: Effektiv konfigurering af kundetilpassede produkter. (1 ed.) København: Nyt Teknisk Forlag.*

Jensen, T. E. (2003). *Aktør-netværksteori: en sociologi om kendsgerninger, karakker og kammuslinger.*

Khurana, A., & Rosenthal, S. R. (1997). Integrating the Fuzzy Front End of New Product Development. *Sloan Management Review*, *38*(2), 103–

Khurana, A., & Rosenthal, S. R. (1998). Towards Holistic "Front

Ends" In New Product Development. *Journal of Product Innovation Management*, *15*(1), 57–74.

Kijkuit, B., & Van Den Ende, J. (2007). The organizational life of an idea: Integrating social network, creativity and decision-making perspectives. *Journal of Management Studies*, *44*(6), 863–882.

Kim, J., & Wilemon, D. (2002). Strategic issues in managing innovation's fuzzy front-end. *European Journal of Innovation Management*, *5*(1), 27–39.

Koen, P., Ajamian, G., Burkart, R., & Clamen, A. (2001). Providing clarity and a common language to the "fuzzy front end." *Research-*, *44*(2), 46–55.

Kvale, S. (1997). *InterView : en introduktion til det kvalitative forskningsinterview*. Hans Reitzel.

Latour, B. (1992). Where are the missing masses? The sociology of a few mundane artifacts. *Shaping Technology/Building Society: Studies in Sociotechnical Change*, 225–258.

Latour, B. (1999a). On Recalling ANT. *The Sociological Review*, *46*(S), 15–25.

Latour, B. (1999b). *Pandora's hope : essays on the reality of science studies*. Harvard University Press.

Latour, B., & Woolgar, S. (1986). *Laboratory life : the construction of scientific facts*. Princeton University Press.

Law, J. (2002). *Aircraft stories : decentering the object in technoscience*. Duke University Press.

Legardeur, J., Boujut, J. F., & Tiger, H. (2010). Lessons learned from an empirical study of the early design phases of an unfulfilled innovation. *Research in Engineering Design*, *21*(4), 249–262.

Leifer, R., Colarelli O 'connor, G., & Rice, M. (2001). Implementing Radical Innovation in Mature Firms: The Role of Hubs. *Source: The Academy of Management Executive*, *15*(3), 102–113.

Levitt, B., & March, J. G. (1988). Organizational Learning. *Annual Review of Sociology*, *14*(1), 319–338.

Liker, J. K., & Morgan, J. M. (2006). The Toyota Way in Services: The Case of Lean Product Development. *Academy of Management Perspectives*, *20*(2), 5–20.

James G. March. (1994). *Primer on Decision Making: How Decisions*

Happen. Free Press

March, J. (1991). Exploration and exploitation in organizational learning. *Organization Science*, *2*(1), 71–87.

Markham, S. K., & Lee, H. (2013). Product development and management association's 2012 comparative performance assessment study. *Journal of Product Innovation Management*, *30*(3), 408–429.

McDermott, C. M., & O'Connor, G. C. (2002). Managing radical innovation: An overview of emergent strategy issues. *Journal of Product Innovation Management*.

Mol, A. (1999). Ontological politics. A word and some questions. *The Sociological Review*, *47*(S1), 74–89.

Murphy, T. (2015). *Sensemaking*. Hans Reitzels forlag

Møller, L., & Tollestrup, C. (2013). *Creating Shared Understanding in Product Development Teams*. London: Springer London.

Spradley, J. P. (2016). *Participant observation*.

Stengers, I. (2005). The cosmopolitical proposal. *Making things public: Atmospheres of democracy*, *994*

Tidd, J., & Bessant, J. R. (2009). *Managing innovation : integrating technological, market and organizational change*. Wiley.

Vergne, J. P., & Durand, R. (2010). The missing link between the theory and empirics of path dependence: Conceptual clarification, testability issue, and methodological implications. *Journal of Management Studies*, *47*(4), 736–759.

Vikkelsø, S. (2007). Description as Intervention: Engagement and Resistance in Actor-Network Analyses. *Science as Culture*, *16*(3), 297–309.

Weick, K. E. (1979). *The social psychology of organizing*. Addison-Wesley Pub. Co. McGraw-Hill

Weick, K. E. (1995). *Sensemaking in organizations*. Sage Publications.

Weick, K. E. (2009). *Making sense of the organization, Volume 2: The impermanent organization* (Vol. 2). John Wiley & Sons.

Yin, R. K. (2014). *Case study research : design and methods*. Sage publications

http://www.dictionary.com/browse/culture?s=t accessed on the April 27th 2017.

http://www.dictionary.com/browse/constitution?s=t accessed on April 28th 2017

CASE GLOSSARY

ANT	Actor Network Theory
BD	Business Development (Exploration, part of BI)
BI	Business Innovation (Exploration)
CD	Concept Development(Exploration, part of BI)
CEO	Chief Executive Officer
COO	Chief Operating Officer
Front end	Front end of Innovation
G2	Gate 2, The gate between exploration and exploitation
KPI	Key Performance Indicators
Leap	Case example project
PI	Product Innovation (Exploration)
UX	User Experience
VP	Vice President

KØBENHAVN
AALBORG UNIVERSITET

AALBORG UNIVERSITETSFORLAG